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AN EXPERIMENTAL COMPARISON OF DRILL AND DIRECT EXPERIENCE IN ARITHMETIC LEARNING IN A FOURTH GRADE

LOWRY W. HARDING and INEZ P. BRYANT
Ohio State University

Editor's Note: There has been now for some years some considerable theoretical interest in functional learning. The authors secure better results in problem solving from this method than from the drill method.

INTRODUCTION

DURING the early part of the present century the development of standardized tests focused attention upon the teaching and learning of specific items of knowledge and the mastery of discrete skills. In no subject was this trend stronger than in Arithmetic, where major emphasis could be placed so easily upon the computational skills. The effectiveness of the teaching-learning process was increasingly judged by the speed and accuracy of performing computational processes. As a result, drill became the almost universal mode of instruction.

Drill methods did not succeed in developing in pupils the ability to apply arithmetical skills to the solution of practical problems. In some cases drill appeared to be a handicap (2). As evidence accumulated that intelligent mathematical behavior was not learned through drill (3), many teachers began using experimental, liberalized procedures. This took various forms, such as delaying formal teaching of the subject (1), striving for more "exact" grade-placement in terms of Mental Age and other factors (12), or of developing "activity" programs (7).

The trend away from drill toward the teaching of arithmetic through functional activities gained much ground during the past decade. Many reports indicated that the functional approach was effective (8, 9, 10, 11, 13),

although most of the reports were from the lower grades. It began to appear that the "arithmetic problem", the biggest obstacle to curricular reorganization and the bugbear of so many children and teachers, was being solved. With teachers having learned to use standardized tests as tools, rather than allowing them to direct the teaching process, and learning to teach functionally, it seemed that arithmetic might become interesting and teaching programs effective.

During the past few years this trend appears to be reversed. Opinions of individuals (14) and reports from influential organizations (6, 12, p. 42) indicate that functional programs of arithmetic teaching are being considered inadequate, especially for the intermediate and upper grades. These reports and the pressures of the present world situation are causing many teachers to abandon liberalized procedures. The thorough understanding and mastery of arithmetic assumes critical importance in view of the increasing need for technical services which require mathematical ability. Complaints to the effect that schools have failed in teaching the "Three R's" are heard with increasing frequency. The results of the Army tests and reports from personnel departments of industry concerning the results of their "fitness" tests are far from reassuring. Not understanding the techniques of a "functional" program or lacking faith in their effectiveness in its use, and realizing the importance of "results", teachers are rapidly reverting to the most formalized drill.

In view of the confusion and conflict in the thinking and practices of teachers of arithmetic, there is need for all available information concerning the effectiveness of various materials and procedures. The experiment reported in this article is pertinent because it was conducted in an intermediate grade of a public school in a large city system with no unusual material or equipment. It bears directly upon the larger problems of method and "results" or outcomes of instruction. It is hoped that readers will consider it "reportorial" rather than controversial, and make whatever practical uses of it as seem feasible.

THE PROBLEM

It is generally assumed that different instructional procedures result in different kinds of learning. That assumption gives rise to the many arguments concerning methodology. Questions concerning what instructional procedures are most effective in promoting understanding, developing com-

putational skills, improving ability in problem-solving and in providing for individual differences have not been answered conclusively. It has been suggested that social problems furnish a vitalizing basis for teaching (4, 13) and that experience with problems may aid children in solving them (3, 9, 15), although both are frequently questioned. All these questions need further inquiry.

Many teachers agree that experience learning, through functional activities, offers unusual opportunity for practicing democratic relationships, developing "personality" and stimulating independent thinking. They are less certain that such procedures are practical in "traditional" schools, especially in the intermediate and upper grades, or that they yield results as satisfactory as more formal procedures in subject-matter achievement. Studies are needed which bear upon these points.

The problem of the study reported here was whether pupils taught through functional procedures would attain as high achievement on standardized measures of computation and reasoning as would pupils taught by formalized drill methods. There were several related problems which are stated below. Could concrete experiences involving mathematical procedures be introduced into one classroom of a public school without disturbing other teachers or disrupting the school program? Is a vitalized program possible within the limits of instructional materials regularly provided or obtainable without special expenditure by the teacher or school treasury? Is it possible to cover the material included in the Arithmetic Course of Study for one grade by means of concrete experiences and is such a method practical in terms of teacher time and energy expended? What are the comparative achievements, from the two methods of instruction, in social adjustment and emotional stability?

The experiment was conducted on the fourth grade level in a departmentalized school in a city system (population approx. 350,000) where classifying, marking and promoting are on the basis of subject-matter achievement. The pupils used as subjects were those regularly enrolled in the fourth grade of the school. They came from within the confines of the school district and represented a typical cross section of its constituency, a lower middle class group.

As the school system uses the semester plan, the study included two groups of "4A" pupils. It covered one semester's work with each group.

The same teacher worked with both groups, thus avoiding questions concerning the relative efficiency of several individuals in terms of personality or teaching ability, although raising the questions of the teacher's personal preference of approach and relative skill in each. These questions may be answered by the school principal, the members of the teaching staff and the director of the experiment. In the judgment of these individuals the teacher's preferences were not evident in the proceedings used in either part of the experiment. Their opinion, based upon frequent observation, was that each of the two methods was used conscientiously and effectively. No difference in skill was observed, although any difference in teaching skill should have favored the drill method, due to longer experience with drill techniques.

By starting the experiment in the last semester (spring) of one school year and finishing it during the autumn (first semester) of the next school year, the intervening summer decreased the danger of a "halo" effect from the use of one method influencing the use of the other. As a further safeguard, the records kept on each group were stored, without being summarized, in a place inaccessible to the teacher or director. They were made available for study, summary and analysis only after the work of both groups was completed. Possible seasonal influence upon learning was recognized and taken into consideration in evaluating the results of the study.

Throughout the discussion following, the two groups will be designated as "experimental" and "control". The group with which personal experience projects were used to the exclusion of drill is termed the experimental group. The class which followed a textbook and had formal drill procedures of the usual type is designated as the control group.

PROCEDURES WITH THE EXPERIMENTAL GROUP

Because of limitations inherent in a departmentalized school situation—disintegration of total school experiences of pupils, lack of complete planning among the teachers, and difficulties in securing full use of building and equipment—the activities and projects used were those which could be carried out during the period when the teacher conducting the experiment was in the room with the pupils; that is, during the "Arithmetic" period. The problems for the experimental group were found in activities which were selected because of richness in mathematical possibilities, adaptability to the situation, simplicity of execution and appeal to the children. Every idea and activity used was decided by majority vote of the pupils, after discussion,

investigation of materials, costs and probable results. The evaluation of these factors by the pupils often furnished experiences which were as educative as the actual project.

The pupils in the group sold candy to the other children in the school—after lunch, for they investigated and found that it was not well to eat candy before a meal. Some of the candy was purchased from a wholesaler and sold at retail, some bought from a retailer at reduced prices for quantity purchases, and some was made by the children after purchasing the necessary ingredients.

They weighed and measured themselves for the grade health chart; they kept a temperature chart and a weather chart for the classroom. They bought material—after much pricing and comparing of samples—and made curtains for the windows of their classroom, using the profits from the candy sales. The school having decided to have a kite-flying contest, the pupils of the experimental group constructed their own kites, as well as a few extra ones for sale. They conducted a paper sale, measured and diagrammed the room for a rearranged seating plan, sold and served lunch to the other children, and conducted a number of less ambitious activities involving use of arithmetic.

All of the activities were happenings of timely interest to the group. Being their own suggestions, decided upon after much discussion, they were performed wholeheartedly and enthusiastically. The experiences were rich in possibilities for developing quantitative thinking, for giving practice in computation, for developing habits of intelligent behavior in dealing with problems, and in opportunities for democratic living. Of course, the pupils made mistakes. But they did not make many, for they were intensely interested in the jobs they were doing. Seldom did a child make the same mistake twice, for the consequences of mistakes were made clear in concrete terms. Children checked and rechecked their work, frequently asking other children to go over it with them.

Perhaps no other activity offered as many possibilities as the lunch which the group prepared, sold and served to the other children in the school. It furnished practice in comparing price and quality of materials to determine what and where to buy; in estimating quantities to order; in figuring costs; in measuring quantities; in figuring proportional parts; in adjusting numbers of workers to amounts of work to be done in various jobs; in making out and checking bills; in collecting and counting money; in

paying bills and figuring profits. Plans were made concerning the most practical and attractive menu to serve, the best way of preparing food and the most efficient division of labor; the best way of serving, the way to save most time in order to serve quickly and keep warm food warm and cold food cold, keeping in mind limitations of space and equipment. This enterprize, in which responsibility for real work was assumed by the group, collectively and as individuals, was a real adventure in social living, giving experience in planning, executing and evaluating.

Another typical example was the kite flying contest. This gave experience in buying string and paste, in measuring, and in cutting without waste. It also brought up such problems as wind resistance, the relationship of length of tail to size of kite and the weather, the problem of bowing a kite and techniques of flying. Since approximately two hundred children were to participate, rules for the conduct of the contest had to be developed, involving a wholesome exchange of ideas, opinions and experiences.

All activities, projects and problems carried on by this group were used for the "arithmetic" portion of the curriculum. They were solved by individuals, by small groups and sometimes by the class as a whole. When a new process was needed it was discussed, explained and demonstrated. A few sample applications were made and the work of the group proceeded. Not infrequently children developed understandings of new processes and operations in terms of their needs for using them, without outside help. Arithmetic textbooks were used occasionally, as references or for explanations of processes, but not for systematic teaching or practice. The teacher prepared a chart of the textbook assignments following the course of study and, as processes listed in it occurred in classwork, checked them. However, this was kept only as a private record and reference. It was not used to influence or direct the activities of the group.

Table I was prepared from that chart and shows the number of days on which various processes were used by individuals or groups in their work upon various enterprizes. It should be remembered that the work with this group covered one semester, or ninety school days.

PROCEDURES WITH THE CONTROL GROUP

The control group followed the adopted text for the grade in its Arithmetic. Page by page assignments were made. Addition, subtraction and multiplication were reviewed. Besides this review, the course of study assign-

ment for the semester included the more difficult aspects of multiplication, the easier steps in division, drawing to scale, and introduction of ideas of parts of numbers.

The major portion of the work was division. The drill method was used in teaching this process. Work involving a review of the first three fundamental processes was given regularly throughout the semester by means of problems and mixed drills. All drill exercises were individualized rather than competitive, children being urged to improve their own records. The records of individual children were not compared with records made by others.

TABLE I

FREQUENCY OF OCCURRENCE OF ARITHMETIC PROCESSES IN ACTIVITIES

	Adding	Subtracting	Multiplying	Dividing	Finding Averages	Measuring	Estimating	Counting Change	Fractional Parts	Reading Thermometer	Making Graphs
Candy Sale	76	76	44	32	5	11	16	70	15	0	0
Health Record	24	41	13	18	16	24	12	0	19	0	8
Keeping Attendance	77	23	34	27	14	0	13	0	11	0	12
Making Bookshelves	12	12	9	10	7	12	12	0	8	0	0
Making Curtains	12	12	12	9	4	11	7	5	7	0	0
Making Display Cases	11	11	11	8	3	10	9	3	7	0	3
Making Kites	5	10	10	7	5	17	13	6	11	0	0
Paper Sale	7	7	7	5	3	5	5	2	4	0	2
School Lunch	32	36	36	20	6	30	32	36	19	0	6
Scoring Games	61	24	16	27	17	0	11	0	13	0	14
Temperature Chart	11	32	9	14	8	9	26	0	0	62	17
Weather Chart	9	7	4	8	6	5	17	0	0	45	11
Other Activities	33	51	18	18	9	62	49	17	53	0	18

Daily assignments were made, with seat work, checking of papers, making corrections and blackboard work. Explanations and demonstrations were usually made by means of blackboard and pointer. Every effort was made to exemplify the more efficient of "typical" procedures.

FINDINGS AND COMPARISONS

The results of the two methods of instruction were determined by comparisons of the growth of the two groups in computational ability, reasoning ability, social adjustment and emotional stability. Subject-matter results were

determined by comparing the gains made by the two groups on alternate forms of the Stanford Achievement Test. Relative progress of the groups in the other aspects of growth was determined by comparisons of anecdotal records kept for each group and by comparisons of full school records of each child, made before and after the experiment.

Comparisons of the achievement of the two groups can be made intelligently only in terms of some estimate of their ability and subject-matter understandings at the beginning of the study. Table II shows the range and distribution of intelligence quotients of the children in the two groups. The I. Q. ratings were secured on the Stanford-Binet Individual Intelligence Test, administered by the staff psychologist.

TABLE II

INTELLIGENCE QUOTIENTS

I. Q.	Experimental Group	Control Group
111—115	0	1
106—110	3	2
101—105	1	6
96—100	5	2
91—95	4	3
86—90	5	6
81—85	2	7
76—80	5	2
71—75	1	1
66—70	3	0
61—65	2	3
Total*	31	33
Range	50	55
Median	88	89
Mean	86.7	89.4
S. D.	±12.95	±12.85

* Three children in the experimental group and two in the control group transferred to another school before the end of the experiment. The records of these five children were omitted from all computations and comparisons. The totals shown in the above table represent those pupils in attendance throughout the study.

While the children composing the two groups were not selected, they were approximately equal in I. Q. ratings. The differences in range and distribution are minor so that, for all practical purposes, the two groups may be considered comparable.

The standing of the two groups in computation and reasoning, at the beginning of the experiment, is shown in Table III. For easy comparison the scores have been reduced to grade levels and grouped.

TABLE III

ACHIEVEMENT RATING BEFORE THE STUDY

Grade Level	Computation		Reasoning	
	Exp.	Control	Exp.	Control
5.0—5.4	0	1	1	2
4.5—4.9	3	3	8	7
4.0—4.4	12	11	7	11
3.5—3.9	9	6	7	2
3.0—3.4	7	12	8	10
2.5—2.9	0	0	0	1
Total	31	33	31	33
Range	2.0	2.5	2.5	3.0
Median	3.7	3.9	4.0	4.2
Mean	3.88	3.80	3.99	4.00
S.D.	±.47	±.56	±.61	±.67

Both groups were slightly below the fourth grade achievement standard of the test. Since they were leaving 4B and just entering 4A when subjected to the test, both groups were approximately one-half grade or five months below the test standard for that stage. The control group had a slightly wider range but not sufficient to make a serious difference in comparisons of achievement.

TABLE IV

ACHIEVEMENT RATING AT END OF EXPERIMENT

Grade Level	Computation		Reasoning	
	Exp.	Control	Exp.	Control
6.0—6.4	1	0	1	1
5.5—5.9	1	1	2	2
5.0—5.4	5	5	8	1
4.5—4.9	6	7	4	3
4.0—4.4	11	9	8	13
3.5—3.9	6	5	6	6
3.0—3.4	1	6	2	6
2.5—2.9	0	0	0	1
Total	31	33	31	33
Range	3.5	3.0	3.5	4.0
Median	4.38	4.31	4.47	4.14
Mean	4.54	4.35	4.62	4.21
S.D.	±.66	±.69	±.76	±.77

The standing of the two groups in computation and reasoning, at the end of the experiment, is shown in Table IV. As in Table III, the data have been grouped in school grades by months or tenths of school years.

It is noticeable that the range of scores for both groups is greater than at the beginning of the experiment, indicating that the fourth grade work in Arithmetic, more difficult than in previous grades, causes individual differences in ability and effort to become more evident. It is also evidence of provision for individual differences, since the pupils were not forced toward an average. It is evident, from the data of Table IV, that both groups were below test standards at the end of Grade 4A. However, their achievement is slightly better than the normal expectation for pupils with mean I. Q. ratings of 85–90.

The gain of the two groups in computation and reasoning, as evidenced by achievement test ratings, is shown in Table V. The Range, Median, Mean and Standard Deviations are shown for each group. The reliability of the difference between the two means in Computation and in Reasoning are also reported, since the reliability of the difference in the achievement of the two groups is an important question in deciding the significance of the findings.

TABLE V

COMPARATIVE GAIN IN COMPUTATION AND REASONING

Index	Computation			Reasoning		
	Exp.	Control	Diff.	Exp.	Control	Diff.
Total Gain (school yrs.)	20.46	18.15	2.31	19.53	6.93	2.60
Range	1.70	1.40	.30	1.90	1.20	.70
Median (gain)	.7	.5	.20	.6	.2	.40
Mean (gain)	.72	.55	.17	.68	.26	.42
S. D.	±.40	±.34		±.46	±.23	
σM	.072	.059	$\left(\frac{\sigma}{D}\right)$ .093	.083	.040	$\left(\frac{\sigma}{D}\right)$ .092

From the above table it may be seen that the experimental group did slightly better than the control group in computation, making approximately two and one-half months greater gain. This is significant in view of the fact that they were not subjected to drill or "practice" procedures. There were more high scoring individuals in the control group, evidenced by the fact that their median was higher. The greater range of scores made by the experimental group is evidence that their achievement

of computational skills was not as uniform as that of the control group. In reasoning the experimental group clearly surpassed the control group in their development, although again the range is much greater. This indicates greater flexibility of provision for individual differences in ability, the more able pupils of the experimental group making greater progress and the less able pupils making smaller gains than the corresponding pupils of the control group. This is what one might expect from the liberalized and regimented programs.

The standard deviations are rather high, as might be expected with small groups and wide ranges of scores. The difference in mean gain in computation may be interpreted as follows: The chances are approximately sixty-eight in a hundred that the obtained difference of .17 does not differ from the true difference by more than $\pm.093$; the chances are ninety-nine in a hundred that the obtained difference of .17 does not differ from the true difference by more than $(\pm 3 \times .093)$ $\pm.28$. Then the true difference lies between $-.11$ and $+.45$ and, since the lower range is negative, the obtained difference is not statistically significant. However, as D/δD (.17/.093) is 1.8 the chances are ninety-six in one hundred that the true difference is greater than zero, favoring the experimental group (5).

In Reasoning, the chances are approximately sixty-eight in a hundred that the obtained difference of .42 does not differ from the true difference by more than $\pm.092$; the chances are ninety-nine in a hundred that the obtained difference of .42 does not differ from the true difference by more than $(\pm 3 \times .092)$ $\pm.28$. Thus the true difference lies between .14 and .45 and, as the lower range is positive, the difference is statistically significant. The D/δD (.42/.092) of 4.5 indicates that the chances are 99+ in 100 that the true difference is greater than zero, favoring the experimental group. This result gives practical certainty (5) that the experimental group is superior to the control group in problem solving.

There were seventeen pupils in each group whose intelligence quotients exactly matched. The gains made by these individuals on before-and-after applications of the achievement test are shown in Table V. The amount of gain is shown in tenths of school-grade achievement levels. That is, .8 represents a gain of eight tenths of a grade, according to the interpolation table of the test.

TABLE VI

GAINS IN COMPUTATION AND REASONING MADE BY PUPILS OF MATCHED INTELLIGENCE QUOTIENTS

Pupils	I. Q.	Computation			Reasoning		
		Exp.	Control	Diff.	Exp.	Control	Diff.
A—A'	110	.5	.4		.8	.6	
B—B'	109	.3	.3		.5	.4	
C—C'	100	.7	.1		1.2	.3	
D—D'	98	.7	.4		.2	.3	
E—E'	95	.7	.3		.9	.4	
F—F'	88	.5	.3		.6	.3	
G—G'	88	.3	.4		.7	.4	
H—H'	87	.8	.7		.3	.0	
I—I'	86	.4	.2		.1	.4	
J—J'	84	.2	.8		.0	.2	
K—K'	82	.0	.4		1.7	.1	
L—L'	80	.2	.6		.6	.7	
M—M'	80	.3	.3		.6	.2	
N—N'	78	.3	.8		.5	.2	
O—O'	68	.1	.1		1.5	.0	
P—P'	67	.0	.3		.6	.4	
Q—Q'	64	.2	.0		.1	.1	
Total Gain		6.2	6.4	.2	10.9	5.0	5.9
Range		.9	.9	.0	1.8	.8	1.0
Median		.36	.39	.03	.55	.35	.2
Mean (gain)		.37	.38	.01	.63	.29	.34
S. D.		±.24	±.23		±.43	±.19	
σ M		±.058	±.056	±.08	±.104	±.046	±.11

Table VI shows that, for the pupils of equal intelligence test scores, those in the experimental group approximately equalled the growth of the control group in computational skill. They made a gain more than twice as great as the control group on the reasoning section of the achievement test. This would indicate that the learning of arithmetic through direct personal experiences may be as effective as formal drill in mastering the fundamentals and more effective in the development of ability to understand and solve problems. Comparisons of these matched pairs of pupils indicate that there may be little relationship between intelligence quotient, within the limits of the range of this group, and growth in computational skill or problem solving ability.

As in Table V, the Standard Deviations are high, probably for the same reasons. In computation, the chances are ninety-nine in a hundred that the true difference lies between —.24 and +.25. This indicates that the mean difference of .01 is not statistically significant. In fact, the D/δD

(.01/.08) of .125 means that the chances are fifty-five in a hundred that the control group will score above the experimental group in computation.

In reasoning, the matched pupils show the same trend as the entire groups. That is, those pupils in the experimental group were clearly superior in their gains. The chances are sixty-eight in a hundred that the obtained difference of .34 does not differ from the true difference by more than ±.11. The chances are ninety-nine in a hundred that the obtained difference of .34 does not differ from the true difference by more than (±3 × .11) ±.33. Thus, it is practically certain that the true difference lies within the limits of +.01 and +.67 and, since the lower range is positive, the obtained difference of .34 is significant. The D/δD is 3+, indicating that the chances are 99.9 in 100 that the experimental group will consistently score above their matched opposites of the control group in reasoning.

TABLE VII

STUDY HABITS, ARITHMETIC GRADES AND CLASSROOM BEHAVIOR COMPARISON OF GROUPS DURING PRECEDING AND FOLLOWING SEMESTERS

Aspects Rated	Study Habits				Arithmetic Grades				Behavior			
Classification	Exp.		Control		Exp.		Control		Exp.		Control	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Improvement	14	.45	7	.21	17	.55	11	.33	12	.39	8	.24
No Improvement	12	.39	16	.49	11	.36	18	.55	14	.45	20	.61
Deterioration	5	.16	10	.30	3	.09	4	.12	5	.16	5	.15
Total	31	1.00	33	1.00	31	1.00	33	1.00	31	1.00	33	1.00

Comparisons were made of the habits of study, school marks in Arithmetic, and classroom behavior of the two groups for the semesters immediately preceding and following the experiment. That is, autumn and autumn for the group taught in the spring, spring and spring for the group taught in the autumn. Thus, the entire study covered four semesters or two school sessions. Table VII shows these comparisons in terms of the number in each group making improvement, no improvement, or making poorer ratings during the semester following their participation in the experiment than they made during the semester preceding it.

It may be seen from the above table that the experimental group had a larger number of individuals making gains in all three items than did the

control group. Also, fewer of them showed "no improvement". It is interesting to note that both groups had very nearly the same number making poorer grades after the experiment than during the semester preceding it and that the control group had more individuals showing deterioration in study habits and behavior. Although the differences are small, this may indicate that pupils experiencing a liberalized, functional program have less difficulty adjusting to a formalized program than has been assumed. Further study is needed on this point.

The comparative ratings of the two groups in emotional stability, initiative and qualities of democratic living were determined by comparison of anecdotes which had been written by the teacher and by selected observers. They were validated by three judges who inspected them carefully, grouped them according to aspects of behavior treated, and rated them according to whether they showed evidence of that behavior being conspicuously present or absent. Approximately eight hundred anecdotes were written and used. Table VIII shows the comparisons of the groups on eight aspects of behavior. The ratings are given in percentages to make comparison clearer.

TABLE VIII

COMPARATIVE RATING OF THE TWO GROUPS ON EIGHT ASPECTS OF BEHAVIOR

Aspects of Behavior Rated	Experimental Group		Control Group	
	Behavior Present	Behavior Absent	Behavior Present	Behavior Absent
Consideration for Others	.91	.09	.76	.24
Cooperation	.79	.21	.68	.32
Emotional Stability	.71	.29	.53	.47
Initative	.92	.08	.81	.19
Intelligent Inquiry	.81	.19	.71	.29
Responsibility—Assumes	.89	.11	.87	.13
Self-direction	.88	.12	.86	.14
Self Evaluation	.97	.03	.68	.32

Table VIII offers evidence that the children in the experimental group showed desirable attitudes, social behavior, and evidences of emotional stability with more frequency than did the control group. It is significant that the control group was rated lowest in emotional stability (53 percent) and in cooperation and habits of self evaluation (68 percent), while the experimental group was rated highest in self evaluation (97 percent), initiative (92 percent) and in consideration for others (91 percent). Emotional

stability was rated lowest of the eight aspects of behavior for both groups (71 percent and 53 percent respectively) but the experimental group was considerably higher than the control.

The evidences from the judges' ratings of the anecdotal material indicate that the "activity-experience" program was more effective in developing desirable personality attributes than was the formalized program. However, one cannot extrapolate from the data on this aspect of the study with any considerable degree of certainty, as the total field of experiences contribute to personality development and, while the experiment dealt with Arithmetic primarily, the pupils were subject to many other influences, both within and outside the school. On the other hand, the fact that the anecdotal material was collected during the arithmetic period exclusively does give some basis for conclusions drawn from the comparisons.

CONCLUSIONS

The authors of this report wish to emphasize the point that the experiment was quite limited, being restricted to one subject on one grade level in one school, to one teacher and two groups of pupils, and to one semester's work with each group. Within these limits all practical precautions were taken. However, in view of the limitations of the study, the data secured should be regarded as tentative in character and received open-mindedly. The study indicates the importance of continued research upon similar educational problems.

The results of the experiment indicate that different instructional procedures do result in different kinds of learning. Direct, first-hand experiences with projects and enterprizes in which children have a personal interest proved more effective than vicarious experiences and drill procedures in developing the ability to solve problems as this ability was measured by the "Arithmetic Reasoning" section of the achievement tests.

The functional use of arithmetic proved as effective as drill procedures in developing computational skill, as that is measured by the achievement tests. True or "functional" learning emphasizes discovery, thinking, and problem solving. Learning "facts" or "tool skills" as a prerequisite to their use in "thinking" apparently is not as effective as mastering the facts or tools through use in thinking upon problems of personal concern to the child.

The other members of the school staff expressed themselves as being undisturbed by the activities and procedures of the functional program. In

fact, several stated that they used incidents from that program in their teaching by reference or as examples of topics under discussion. Thus it may be concluded that individual teachers may develop functional programs of instruction in their own classrooms without waiting for the entire school to be reorganized.

The experience from this study indicates that a vitalized instructional program is possible within the limits of the materials regularly provided or procurable without personal expenditure of money by the teacher. The necessary requirements seem to be initiative, originality and insight into the possibilities for learning which various activities may have. The teacher must do more planning. She must know the individual needs, interests and capabilities of pupils, but will spend less energy in review, re-teaching and general motivation for study.

The results of the standardized achievement tests indicate that it is possible to cover the material in a course of study for a fourth grade by means of concrete experiences. Also, that concrete materials and "alive" problems are more effective than abstract examples and "artificial" problems for learning.

From the information secured, the experience program appears more effective than the formal program in developing emotional stability, desirable social behavior and study habits in children.

A challenging item in the findings is the evidence that, within certain limits, methods and materials of instruction may be more important than I. Q. in the development of certain skills and abilities. Further research is especially needed on this problem.

Many individuals have emphasized the need and importance of a general spirit of inquiry throughout the school system with a continuous process of evaluating educational processes and products. It has also been stated that much of the needed research should be done by teachers since they are usually the first to feel the pressure of unsolved problems as well as the group to put into effect the solutions found. One of the major results of this study may be the evidence that, without unusual equipment or elaborate organization, individual teachers may conduct small experiments in trying out various methods of teaching and in attacking problems of which they have become aware.

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SOME FACTORS AFFECTING A TEST SCORE IN DIVISION OF DECIMALS

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Editor's Note: Arithmetic is one of the school subjects to profit greatly by the application of research techniques. The author finds easy exercises arranged at random as to type of problems or difficulty best.

THIS investigation aims to show how the sequence and the difficulty of examples affect the score a student makes on a test in division of decimals. The experimental subjects were 409 pupils selected at random in nearby school systems to Jersey City, in Grades VI, VII, and VIII, who had been taught all phases of division of decimals. The number of students in each grade was about the same.

There were two forms of the test which are designated Form A and Form B. In about half of the group in each grade, Form A was given first and then followed by Form B. In the other half of each group, the sequence of the tests was reversed.

Form A was one of four forms of a test used in a previous study by the writer.[1] This test sampled the four kinds of examples possible in division of decimals. They are: (1) Dividing a decimal by an integer; (2) dividing two integers with a decimal in the quotient; (3) dividing an integer by a decimal; and (4) dividing a decimal by a decimal. The test was divided into two parts of 21 examples each. One part contained easy examples and the other part contained difficult examples from the standpoint of the division operation. For each type of example in the easy part, there was a corresponding example in the difficult part.

On the easy part of the test, the divisor was a one-figure number, or it was a two-figure number in which the estimated quotient was the true quotient. In the difficult part of the test, the divisor was always a two-figure number. When the divisor was a two-figure number for the easy examples, for the corresponding difficult examples the estimated quotient was not the true quotient. The examples in each of the four parts are given on page 339.

[1] Grossnickle, Foster E. "Types of Errors in Division of Decimals", *Elementary School Journal*, XLII (November, 1941), 184–94.

Easy Examples		Difficult Examples	
1. a. 6) .48	d. 3) 8.4	a′ 18) .72	d 14) 19.6
b. 8) .36	e. 8) 52.4	b′ 14) .21	e′ 18) 47.7
c. 4) .1	f. 3) .81	c′ 12) .9	f′ 25) 7.75
2. a. 6) 3	e. 50) 1	e′ 28) 14	c′ 75) 6
b. 44) 550		b′ 16) 200	
3. a. .3) 9	d. 3.2) 432	a′ 1.6) 64	d′ 1.6) 264
b. .4) 3	e. 7.5) 3	b′ .36) 27	e′ 2.5) 2
c. 2.5) 5		c′ 1.5) 9	
4. a. .2) 7.2	e. .4) .172	a′ 3.6) 93.6	e′ 3.2) .672
b. .51) 107.1	f. 6.5) .1625	b′ .26) 148.2	f′ 3.6) .3132
c. .8) 5.84	g. 6.8) .34	c′ .16) .912	g′ 3.5) .28
d. 4.5) 10.35		d′ 2.7) 12.96	

The test given above was called Form A. Form B included the same examples but arranged in a different order. On the latter form, all of the easy examples were grouped in a random sequence and then all of the difficult examples were arranged in a random sequence. Each pupil took both forms of the test in the order prescribed before. There was not a time limit, so each pupil completed both forms of the test.

The mean number of incorrect examples for both the easy and the difficult examples was determined for each form of the test. The difference between the means for each group in both forms on all three grades was compared with its probable error. The formula for determining the probable error of the difference of the means was the formula which allows for the correlation between the items compared. These data are shown in Table I.

Table I shows that more examples are solved incorrectly for both easy and difficult examples in division of decimals when the examples are arranged

in a random sequence than when they are grouped according to types as on Form A. The difference, though small, is statistically significant for Grades VII and VIII and almost statistically significant for Grade VI. In the latter case the chances are at least 99 out of 100 that the difference between the two groups is greater than zero.

TABLE I

COMPARISON OF RESULTS FOR EASY EXAMPLES AND FOR DIFFICULT EXAMPLES IN FORMS A AND FORM B

School Grade and Test Form	r between corresponding scores on both forms	Mean Number of Incorrect Examples		Difference	
				P. E. Difference	
		Easy Examples	Difficult Examples	Easy Examples (B — A)	Difficult Examples (B — A)
Grade VI (138) #					
Form A	.89e†	4.32 ± .293	4.83 ± .316	3.88	3.47
Form B	.82d	4.84 ± .286	5.49 ± .319		
Grade VII (136) #					
Form A	.83e	4.80 ± .270	5.04 ± .276		
Form B	.82d	5.59 ± .263	5.98 ± .263	5.06	5.80
Grade VIII (135) #					
Form A	.87e	2.44 ± .183	2.73 ± .197		
Form B	.79d	2.86 ± .193	3.13 ± .200	4.38	5.26

Number of pupils.
† Subscript e refers to easy examples; d, to different examples.

In Table I, the easy and the difficult examples on Form A were compared with the corresponding kinds of examples on Form B when the sequence of examples was different. Next the mean number of incorrect easy examples was compared with the mean number of incorrect difficult examples for Form A and then for Form B. The difference of the means was compared with its probable error. These data are shown in Table II.

Table II shows that the differences between the number of incorrect easy and difficult examples on Form A were due to chance for all three grades. The same is true for the differences between the two types for Form B. These results are in agreement with the results found on a previous investigation by the writer. In the study cited, Form A was used and the difference between the means for easy and for difficult examples was compared to its probable error in each of the same three grades used in this study. The ratios were as follows: for Grade VI, 3.66; for Grade VII, 2.77;

for Grade VIII, 2.82.[2] Since both of these independent investigations prove that difficult division examples do not appreciably increase the difficulty of an example in division of decimals, there is no advantage which accrues from using examples of this type that could not be obtained by using easy examples in division.

TABLE II

COMPARISON OF RESULTS FOR EASY AND DIFFICULT EXAMPLES IN EACH FORM OF THE TEST *

School Grade and Test Form	r between easy and difficult examples	Mean Number of Incorrect Examples		Difference
		Easy Examples	Difficult Examples	P. E. Difference
Grade VI				
Form A	.81	4.32 ± .293	4.83 ± .316	2.70
Form B	.78	4.84 ± .286	5.49 ± .319	3.20
Grade VII				
Form A	.82	4.80 ± .270	5.59 ± .263	1.46
Form B	.83	5.04 ± .276	5.92 ± .263	2.55
Grade VIII				
Form A	.80	2.44 ± .183	2.86 ± .193	2.38
Form B	.84	2.73 ± .197	3.13 ± .200	2.50

No published data are available dealing with the arrangement of items in a test in division of decimals. Feder[3] found that a combination of explicit directions and arrangement of items on any test affected scores made on it. Brueckner and Hawkinson[4] found that the examples in fractions of the same structural difficulty could be placed in sequence without impairing the validity of the test. It is clear that neither of these investigations dealt with the same problem offered in this study.

When items of the same type are grouped, it should be easier to make a reliable diagnosis from the results than when the items are dispersed

[2] *Op. cit.*, p. 192.

[3] Feder, Daniel D. "The Effect of Direction and Arrangement of Items on Student Performance in a Test", *Journal of Educational Research*, XXX (September, 1930), 28–35.

[4] Brueckner, Leo J., and Hawkinson, Mabel J. "The Optimum Order of Arrangement of Items in a Diagnostic Test", *Elementary School Journal*, XXXIV (January, 1934), 351–57.

throughout the test. The writer[5] showed, however, that all errors in division of decimals are chance errors except those in which the point is misplaced when an integer is divided by a decimal. In that case, a reliable diagnosis may be made from one illustration. It follows, then, that no particular benefit accrues from grouping like examples which may not be obtained from arranging the items at random sequence, except difference in ease of scoring.

From Tables I and II, two conclusions may be drawn. First, the sequence of examples on a test in division increases the difficulty of the test. Second, difficult division examples have no more diagnostic value than easy division examples in division of decimals. In view of these two considerations, a diagnostic test in division of decimals should have the test items arranged in a random sequence instead of being grouped according to the four possible types. The examples should be easy instead of difficult from the standpoint of the division operation. Easy examples in division do not require as much time for their solution as do difficult examples but the diagnostic value of the easy examples in division of decimals is as great as for those which are difficult.

[5] Grossnickle, Foster E. "Kinds of Errors in Division of Decimals and Their Constancy", *Journal of Educational Research*, XXXVII (October, 1943), 110–17.

THREE STUDIES ON THE EFFECT OF COMPULSORY METRIC USAGE

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Editor's Note: The author studies the compulsory use of the metric system in certain European and South American countries. The compulsory use of the metric system has created a mixed system and confusion in thinking.

IT IS understandable that the leaders of the French Revolution wanted to get rid of the flagrant abuses connected with weights and measures just as they wanted to overthrow everything else which was a part of the decadent French Monarchy's regime. Everything in the "new order" was to be new and they were in an enormous hurry, working feverishly to revolutionize every phase of French life. So to the brilliant mathematicians and scientists of the Académie Royale des Sciences they turned over the task of creating a "new" system of weights and measures. Thus the metric system came into being—a masterpiece of logic and mathematically perfect but, from the point of view of those who had to use it, most impractical and inconvenient. Trade, industry, and the common people were not consulted, but the use of the metric system was made compulsory first in France and later in other parts of the world where the system has been adopted. What have been some of the effects of compulsory metric usage? Several investigators have studied this problem.

An outstanding early study in this field was made by Halsey[1] in 1919. He investigated "the claims made for the metric system, and especially the claim that its adoption is necessary in the interest of export trade." To get an answer to the latter part of the problem, Halsey first sent out some 6,000 questionnaires[1] to manufacturers in the United States. His conclusions, based on an analysis of the 1,445 questionnaire replies,[2] are as follows:

[1] Frederick A. Halsey, *The Metric Fallacy*, New York: The American Institute of Weights and Measures, 1919.

[1] *Ibid.*, p. 35.

[2] Of these, 284 were from manufacturers engaged in export trade from ten to twenty years; 225 from manufacturers engaged in export trade from twenty to forty years; 48 from manufacturers engaged in export trade from forty to sixty years; and 10 from manufacturers engaged in export trade from sixty to one hundred years or more.

1. "That the commerce of the world is conducted by the English system."[2]

2. In production, 82% of United States exporters to metric countries do not use the metric system at all; 14% use it partially; and 3/10 of 1% use it exclusively.

3. In commerce, 1.6% of United States exporters use the metric system in response to a commercial need; 38% make some use of it in shipments, because compelled to do so by the laws of foreign countries; and no exporter uses it exclusively.

Halsey next sent out 500 questionnaires translated into Spanish and Portugese, to South America, Central America, and the West Indies. His general conclusion, based on an analysis of the 116 questionnaire replies from 16 countries, is that in the countries where the metric system has been adopted, confusion and disorder have resulted from the experiment in proportion to the strictness of the enforcement of the laws making its use compulsory.

A second sizable study in this field was made by Kennelly[4] some seventeen years ago in nine countries of continental Europe. His problem was "research into the extent to which primitive[5] units of weights and measures may persist in the European countries which have adopted the metric system."[1] Of the scope of his study he says, "In this report consideration is given mainly to commercial residual units. Industrial residual units have received only minor attention." He further delimits the problem as covering principally the units of length, area (especially land), volume, and weight. The report gives the personal opinions arrived at by Kennelly plus written statements from some sixty officials in the countries visited. His conclusions briefly are as follows:

1. There is overwhelmingly general use of the metric system for internal commerce and the affairs of everyday life throughout the countries investigated.

2. Vestiges of pre-existing systems are rare in France and Germany; less rare in certain countries like Holland; relatively common in Spain and Italy.

[2] *Ibid.*, p. 72.
[4] Arthur E. Kennelly, *Vestiges of Pre-Metric Weights and Measures Persisting in Metric-System Europe 1926–1927*, New York: The Macmillan Company, 1928.
[5] Non-metric.
[1] *Ibid.*, p. 1.

3. In all the countries investigated metricised[2] units are the commonest vestiges; submetricised units are the next commonest vestiges, but are tending either to disappear or to become metricised at some round, simple value in the metric system; while non-metric units are the rarest vestiges. Two only were found—the Rhineland inch and the Balearic ounce.

4. Non-metric vestiges are likely to disappear at a relatively early date; some submetricised old units are likely to continue for a considerable period; a number of metricised units are likely to continue indefinitely as local names for convenient metric quantities.

5. Vestiges of primitive units tend to persist longer in villages and on farms than in cities and towns; and they tend to persist in land areas long after they have disappeared in other fields of utility.

6. Vestigial units also occur in the manufacturing establishments of metric countries and in their external trade relations with other countries which have not adopted the metric system, but these units were not especially investigated in this report.

The writer in 1938 undertook a study of this problem. Part I of the investigation was a preliminary study which included library research, correspondence and interviews with authorities in the field, and visits to museums and machine shops for the purpose of developing as rich and varied a background as possible for the problem. In Part II the research of previous investigators was studied, and the data of Halsey and Kennelly were tabulated, analysed, and interpreted. Part III consisted of field work, its tabulation and interpretation. This field work was carried on for three months in Brazil, Argentina, Paraguay, and Uruguay during the summer of 1939, for the purpose of making a study of the problem on a numerical basis. The weights and measures actually being used were observed and recorded. The investigator made every effort to secure representative and unbiased samplings. A summary of the number of places visited and the contacts made is as follows:

Interior	31	Rural	18
Coast	73	City	86
Total	104	Total	104

[2] Kennelly defines metricised units as old unit names which have been modified to designate some simple value, involving only one significant digit in the metric system as, for example, the German "Pfund" (500 grams); submetricised units as old unit values which are always bought and sold with metric-system apparatus and involving more than one significant digit, as, for example, the Netherlands "Elle" (0.6678 meter); non-metric units as old unit values which are still bought and sold with primitive system apparatus as, for example, the "rheinischer Zoll" (1.03 inch).

The data of the Halsey questionnaire study in South America (Brazil, Argentina, and Uruguay) and the data of the Kennelly study in continental Europe as well as the data gathered by the writer in South America were all tabulated on master-sheets (18 by 24 inches), each of which carried the heading: Weight, Length, Capacity, or Surface. Each sheet had five columns, ruled vertically and headed: Date, Country, Place, Metric,[1] Customary.[2] From this tabulation it was possible to count the number of times the units were mentioned and thus to figure per cents for metric and customary usage.

The following table gives a comparison of the writer's findings with the data of the other two studies in regard to the extent, in general, to which customary weights and measures are used in the countries studied. From this table it will be seen that the per cent of customary usage found by

TABLE I

A COMPARISON OF THE NUMBER OF TIMES CUSTOMARY AND METRIC UNITS WERE MENTIONED IN THE WRITER'S FIELD STUDY DATA, THE DATA OF HALSEY'S STUDY IN SOUTH AMERICA, AND THE DATA OF THE STUDY BY KENNELLY IN CONTINENTAL EUROPE

Units	Halsey Study (Questionnaire) Brazil, Argentina, and Uruguay	Yorke Study (Field) Brazil, Argentina, Uruguay, and Paraguay	Kennelly Study (Field and Official Statements) Continental Europe
Customary	278	778	762
Metric	355	1434	1967
Total Number	633	2212	2729
Per cent of Customary	44%	35%	28%
Per cent of Metric	56%	65%	72%

Halsey was approximately 44%; by the writer 35%; and by Kennelly 28%. In regard to the Kennelly data, it should be pointed out that he limited his investigation to internal commerce. If he had included industries and external commerce (international trade) the percentage for customary usage would have been perceptibly higher. The per cent of metric usage was approximately 56%, 65%, and 72% respectively.

[1] A metric unit is one of the forty-five (not including the franc) weights and measures of the original metric system (1792) and logical extensions of the same.

[2] A customary unit is a weight or measure which through the centuries has survived on the basis of usage rather than fiat.

The writer agrees, in general, with Halsey's conclusions pertaining to Brazil, Argentina, and Uruguay.

In tabulating the Kennelly data the customary column at the extreme right was subdivided into the three classifications which Kennelly adopted: metricised, submetricised, and non-metric. In the writer's opinion such classifications are not justifiable because the units of weights and measures are of primary importance and not the mechanical apparatus of weighing and measuring. The writer maintains that any unit which is not one of the forty-five (not including the franc) weights and measures of the original metric system (1792) and logical extensions of the same, is a customary unit. From the tabulation it was found that customary weights and measures were mentioned 762 times, or according to Kennelly's classification, metricised units were mentioned 303 times, submetricised 189, and non-metric 270 times, giving a percentage of 28% for customary usage and 72% for metric. Therefore, in the writer's opinion, the first four of Kennelly's conclusions are open to question at least, while some of the terminology of his report as well as parts of the report itself show evidence of bias.

The following are some typical findings from the writer's field study in South America. It should be pointed out first that, in general, the use of metric units is disregarded to a great extent in the interior, whereas in the cities the laws are more strictly enforced and, therefore, are evaded. For instance, along the Amazon River it was found that two commodities which the natives sell in quantity, sugar and wood, are weighed and measured by customary units—sugar by the arroba (32.47 pounds)[1] and wood by the palmo (8.66 inches). The sugar is shipped in baskets weighing two arrobas (approximately 65 pounds) and the wood, which is used by the river boat, is cut into lengths of four palmos (approximately 35 inches). Also the principal cargo, gasoline and petroleum, destined for Manáos, is shipped in barrels, labeled 53 gallons and 55 gallons respectively. Nuts along the river are sold by the quintal[2] (129.88 pounds) and arroba; while rice, corn, fish, and tobacco are also sold by the latter unit. At Santarém, a town five hundred miles up the river, oranges are sold by the arroba, the quintal, and the duzia (dozen), and the writer found here a waterman using a twenty gallon gasoline can for a measure. He was selling a can of water for 100 réis

[1] A bushel of oats weighs 32 pounds.
[2] There are 4 arrobas in a quintal.

(½ cent in U. S. currency). In this connection Señor Hardtmeier, an exporter, reported that he, too, had seen such cans used as measures for cocoa in the interior near Bahia, and that the arroba is used there also for weighing cocoa, coffee and sugar. The United States Consul at Bahia corroborated this statement in regard to the use of the arroba for weighing cocoa, while the Vice Consul at Santos stated, likewise, that the arroba and half arroba are used in the nearby interior for coffee, sugar, salt pork, and cereals. The general store in Villa Sao Carlos, a village on the banks of the Amazon, sells farinha by the alqueire (1.03 bushel) and quarta (1.03 peck); tobacco by the libra (1.01 pound) and onça (1.01 ounce); and eggs and oranges by the duzia (dozen). Here distance is measured by the milha (1.37 mile) and legua (4.09 miles) the writer was informed. A fellow traveler reported that, when buying lace in Fortaleza, Ceará, and in Maceió, Alagôas, she had seen the native women measure lengths from the end of the nose to the finger-tips. They also sell by the piece. One piece, which the lace-maker said contained four metros (4.38 yards), actually was thirteen yards long, indicating that this Brazilian woman did not comprehend even the approximate length of a metro (meter).

The situation in the cities, however, is quite different. Stricter inspection and enforcement of the law, involving penalties of fines or imprisonment, or both, cause people to devise methods of evasion. For instance, in Uruguay where the enforcement of metric usage is stricter than in any of the other South American countries visited by the writer, one of the owners of a large importing concern in Montevideo explained that, in order to comply with government regulations which impose a fine if any weights and measures except metric appear in catalogues or newspapers, his company assigns approximate metric units to imported goods. In their catalogue, therefore, a can of "Sanka Coffee" is listed as weighing 600 gramos (21.18 ounces); a package of Grape-Nuts 420 gramos (14.83 ounces); a box of Diamond Crystal Shaker Salt 800 gramos (28.24 ounces); while Hiram Walker's London Dry Gin is listed as put up in a one litro (1.057 quart) botella. Another method of evasion was explained to the writer by the manager of a large general importing company. This firm sells towers by number but the customer understands that these numbers refer to the height in feet. Thus, a number 50 "torre" is a fifty-foot tower. The same subterfuge is used in Buenos Aires for bolts. A number 32 bolt means thirty-two

threads to an inch, the diameter being given also as ¼, ⅛ and so forth, indicating the size in parts of an inch.

People in all countries where metric usage is compulsory have been unwilling to give up their convenient customary land measures, with which they are familiar, and to use in place of these the inconvenient "are" (119.6 square yards) or "hectare" (2.47 acres). In regard to cattle-breeding land, in particular, it is important to the Brazilian rancher to be able to visualize how many cattle can feed on an alqueire (6 acres). In this connection it should be noted that "Brazil—Statistics, Resources, Possibilities," an official publication by the Ministry of Foreign Affairs for 1937, gives on page 142 the area of coffee cultivation in alqueires, and the coffee production in arrobas (33.3 pounds). The area of zircon deposits is given in alqueires on page 52, while the area under cotton cultivation is given in alqueires, and cotton production in arrobas per alqueire. A footnote states that, "This statistical data was furnished direct by the planters in the act of buying the seeds." The United States Vice Consul at Santos also reported the use of the alqueire Paulista (6 acres) in the interior.

In Buenos Aires, Argentina, the vara (2.84 feet) and the square vara (8.07 square feet) are commonly used for measuring land. The "Buenos Aires Herald" for August 28 and September 1, 1939, offer a number of examples of this. For instance, one advertisement reads, "Temperley in front of station 20 minutes from Constitution. New boarding house, just opened in park of 7000 varas [19,880 feet]. Ten front bedrooms," and so forth. The following is another advertisement: "Best part of Beccar, P. Uriburu corner of Acasuso, ground plot 450 vs. [1,278 feet] to be sold. Two squares from station." Needless to say metric measures are used also.

Timber land, cattle-ranches, yerba maté or quebracho properties, in fact all large estates in Paraguay, are sold by the legua or league (3.11 miles), a secretary at the United States Consulate reported. Legua is used, too, in speaking of distance. For instance, an Argentine lady whom the writer met on the S. S. General Alvear en route to Buenos Aires said she had been visiting at a ranch located 40 leguas (124.4 miles) from Posados. Deeds of land here, also, mention customary units as well as metric. The old deeds, of course, give all the measurements in Spanish units, whereas the new deeds use both customary and metric measures.

In Uruguay, likewise, old deeds give customary measures: varas (2.84 feet), square varas (8.07 square feet), and so forth; while new ones give

only metric measures, if the property has not been sold before and so the document is an original deed. In rural districts, as in Paraguay, estancias (ranches) are bought and sold by the legua and by the cuadra (94.71 yards or 284.13 feet). The findings in regard to deeds were the same for both Argentina and Brazil.

Tools and machinery, most of which are imported either from the United States or England, are almost entirely calibrated to the inch. In the lumber industry customary units are used widely; for river and sea navigation they are used excluisvely as they are, also, for time; and for temperature both kinds of units are used, most thermometers carrying the two scales—Fahrenheit and centigrade.

A summary of the general conclusions which the writer drew from her investigation is as follows:

1. The customary weights and measures used in trade and industry in the countries studied in continental Europe and South America, where the use of metric units is compulsory, are those which are most convenient, and so have become a part of the people's thinking such as: the inch, the pound, and the foot. Next to these three in frequency of use in South America are the arroba (25.35 pounds)[1] and the palmo (8.66 inches).

2. The extent, in general, to which customary weights and measures are used in the countries studied is approximately 44% as indicated by Halsey's data for Brazil, Argentina, and Uruguay; 28% as indicated by Kennelly's data for continental Europe; and 35% as indicated by the writer's data for Brazil, Argentina, Uruguay, and Paraguay. Obviously, that is not inconsequential because the use of metric units is compulsory in all of the countries studied.

3. The compulsory use of metric weights and measures has had the following effects in the countries studied:

a. It has created a mixed system. The metric units never have been used exclusively, even in France, where the customary tonneau de jauge or gage-ton (100 cubic feet) has been officially adopted,[2] together with customary units of time, angles, and navigation, as well as many modified units, such as the demi-kilogramme and the double-mètre,[3] which are permitted to meet the requirements of the law and yet allow the people to think in customary units.

b. It has caused confusion in thinking.

c. It has caused much useless labor in calculating and making conversions.

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[1] Spanish.
[2] Kennelly, *op. cit.*, p. 53.
[3] Demi-kilogramme (livre or pound). Double-mètre (toise or fathom).

d. It has caused disregard and evasion of the laws.

e. It has caused a great amount of social and private cost to:

(1) The governments, for inspectors and enforcement;

(2) Business, industry, trade, and commerce, for calculating conversions, and for machinery equipped with both customary and metric gages and devices.

f. Due to the mixed system it has made learning in the field of weights and measures more difficult for children in the schools, necessitating the learning of conversions as well as many additional units.

One important implication of the writer's investigation bears upon the educational question of teaching the metric system in the schools of the United States. The evidence beyond any doubt makes clear that it should not be taught as a basic system which will ultimately replace our present one, because:

1. The metric system as such exists only on paper. Actually in use there are a few isolated units, together with their halves and quarters.

2. The twenty-eight metric weights and measures which were legalized in the United States in 1866 are used scarcely at all except in laboratory work, where the gram and cubic centimeter are convenient. For such specialized work these particular units should be taught when needed.

3. The advantages claimed for metric weights and measures are pure academic theory. In practice they have more disadvantages than advantages.

4. Just as a nation's language cannot be taken away and replaced overnight, so its weights and measures cannot be either.

Another implication bears upon the question of whether or not metric usage should be made compulsory, enforced by penalties, in the United States. Again this study gives conclusive evidence that such compulsory legislation would be a great mistake because:

1. The use of twenty-eight metric weights and measures has been permissive for the past seventy-five years, and yet they have made no headway on merit, except in the chemical laboratory.

2. The uniformity of the English system would be lost, and a mixed system would result, causing confusion and useless expense, such as have been experienced in Europe and South America. Furthermore, because the United States is a highly industrialized country, the confusion and expense of a forced change to metric units would be much greater than in South America which was little developed industrially when the change was attempted there in 1862.

DO PUPILS LEARN TO USE DIACRITICAL MARKS?

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Editor's Note: Diacritical marks are used to assist one to pronounce unknown words. The author finds that neither elementary nor secondary school pupils can use these marks effectively.

DIACRITICAL marks used with a phonetic respelling of an unknown word enable one to pronounce the word correctly. The ability to use diacritics with a phonetic respelling of an unknown word is evidence that pupils are becoming increasingly independent of their teachers. The good elementary school aims to make its pupils increasingly independent of their teachers. In no phase of elementary education is such an aim more important than in giving pupils the ability to analyze an unfamiliar word and arrive at its correct pronunciation by using a complete symbolization as a phonetic aid.

A recent publication on the teaching of reading in the intermediate grades makes the following statement about helping pupils to analyze unknown words: "Pupils usually benefit by a knowledge of the principles governing vowel and consonant sounds, of the structure of words, of diacritical markings, and of the use of keys to pronunciation provided in glossaries and simple dictionaries" (1:22). Another book on the teaching of reading has this to say about pronunciation: "A good reader first of all knows how to pronounce words. He knows the sounds of which the words are composed; he recognizes the English sounds by ear, and by sight when he looks words up in the dictionary. Such recognition requires ear training through the early and middle grades, and a knowledge of diacritical marks" (2:316). Hence, in the two sources mentioned above the authorities on the teaching of reading have stated their point of view as to the value of teaching the diacritical marks.

PROBLEM

The problem in this study was to determine how well the public elementary and high schools are helping pupils to acquire a mastery of a complete symbolization as a phonetic aid in making an independent analysis of unfamiliar words. The degree of mastery was to be evidenced by pupils' scores made on a synthetic word pronunciation test.

PROCEDURE

The Test.—A test was prepared which consisted of seventy-five synthetic or nonsense words. The paper on which this test was printed was ruled so as to make twenty-five squares. The squares were numbered from left to right, beginning at the top of the sheet, as follows: 1, 2, 3, etc. Each square contained three synthetic words. The three words in any square on the test sheet were as much alike as to the sequence of English speech sounds in the spoken words which they represented as it was possible to make them.

In order that the reader of this article may know which words were pronounced in the test, the words that were pronounced are underscored. On the test sheet given to each pupil the words were not underscored. The test used in this survey is printed on page 354.

The Administration of the Test.—Having presented each pupil in a classroom with a copy of the test, the examiner said, "I am going to pronounce one word in each square. I will pronounce that word three times. If you do not (after three pronunciations) have an awareness of the sequence or order of the sounds in the word, please ask that the word be pronounced again and again until you are satisfied that you have heard the English speech sounds in that word in their proper sequence."

Method of Scoring the Test.—This test is much like a multiple-choice test. It was, however, thought that guessing would be rather prevalent in this examination. To correct for guessing the formula R — 2W (rights minus twice the wrongs) was used.

DATA

Table I contains the scores made on the test used in this survey. The frequencies are listed by grades rather than schools.

Table I presents evidence which seems to indicate that pupils in the fourth grade learn very little about the use of diacritical marks during their first semester in that grade. A mean score of 0.27 of a word out of a possible score of twenty-five words is evidence that better instructional materials and more effective instructional methods should be used. Mean scores of 2.78, 2.93, and 3.97 for Grades V, VI, and VII seem to present evidence to indicate that little growth in the use of the diacritical marks is achieved in

WORD-ANALYSIS TEST, FORMS A, B & C

1 yăth yăf yĕth	2 zōth zōv zōz	3 zĕngk wĕngk vĕngk
4 shoung shoun soung	5 bōō shān′ bōōsh ān′ bōōs hān′	6 dô′ zăm dŏ′ zăm dŏ′ săm
7 nŏf′ fōōl nŏth′ fōōl nŏth′ fōōl	8 gēr tēl′ gēr tĭl′ gēr tăl′	9 hŭ măth′ hŭ măf′ hŭ măf′
10 poi kă′ pou kă′ poi kĕ′	11 zēr dĭf′ĭn zûr′ dĭ fin zēr dĭ fin′	12 mā′tă wô mĕ′tă wô mā tă wô′
13 shā′vă lĭ shĕ′vă lĭ shĕv′ă lĭ	14 zā lĭd′ĭj zĕ lĭd′ĭj zā lĭd′ĭj	15 nĕch′ă nĭ nĕsh′ă nĭ nĭch′ă nĭ
16 rŏzh ă nā′ rŏzh ă nĕ′ rŏzh ă nā′	17 săj′ă lăn săj′ă lăn sĕj′ă lăn	18 sărg′ă lĭ sōrg′ă lĭ sûrg′ă lĭ
19 kwēr ōō′mă kwēr ōō′mă kwēr ou′mă	20 sŭf′ō nĭ sŏf′ō nĭ sĕf′ō nĭ	21 bū shô′nĕ bū shô′nĭ bū shô′nă
22 ĭz′ă wĭk ĭz′ă wĭk ĕz′ă wĭk	23 nō tā′zhăn nō tā′shăn ă as in about, sofa nŏ tā′zhăn	24 dâr rĭzh′ăn dēr rĭzh′ăn dēr rĭzh′ăn
25 dĭ kŏt′ăm dĭ kĕt′ăm dĭ kăt′ăm		

these grades. Mean scores of 5.09 and 5.27 made by Grades IX and XII seem to indicate that little progress is made in Grades X, XI and XII toward an effective use of diacritics in the public high schools used in this study.

TABLE I

DISTRIBUTION OF SCORES MADE ON A SYNTHETIC WORD-PRONUNCIATION TEST BY 1084 PUPILS IN GRADES IV–XII

Step-Interval	Mid-Point	Frequencies by Grades									
		IV	V	VI	VII	VIII	IX	X	XI	XII	Total
24– 26	25	------	------	------	------	------	------	------	------	------	------
21– 23	22	------	------	2	4	2	------	------	------	------	8
18– 20	19	------	------	------	2	3	------	------	1	------	6
15– 17	16	1	1	3	5	10	4	5	3	8	40
12– 14	13	1	4	2	8	7	7	2	4	4	39
9– 11	10	13	27	14	32	24	20	23	11	22	186
6– 8	7	5	23	12	20	25	11	12	5	12	125
3– 5	4	36	43	27	61	36	29	15	10	32	288
0– 2	1	23	17	18	15	10	14	7	3	12	119
–3– –1	–2	26	25	24	38	14	9	8	8	9	161
–6– –4	–5	13	9	8	8	3	1	0	2	4	48
–9– –7	–8	9	14	4	6	2	3	1	1	2	42
–12– –10	–11	3	2	1	1	0	1	0	1	1	10
–15– –13	–14	4	0	0	2	1	0	1	0	0	8
–18– –16	–17	0	0	0	0	0	0	1	0	0	1
–21– –19	–20	1	0	0	1	0	0	0	0	0	2
–24– –22	–23	0	0	0	0	0	0	0	0	0	0
–27– –25	–26	1	0	0	0	0	0	0	0	0	1
Number of Pupils		136	165	115	203	136	99	75	49	106	1084
	M	0.27	2.78	2.93	3.97	6.21	5.09	5.76	5.35	5.27	3.91
		6.52	5.85	6.04	6.63	6.19	5.53	6.16	6.67	5.28	6.43
	σσ	0.40	0.32	0.40	0.33	0.33	0.39	0.50	0.68	0.36	0.14

SUMMARY

The data obtained in this survey seem to present evidence which indicate (1) that pupils in both the public elementary schools and the public high schools are unable to use the diacritical marks effectively, or (2) the test used was unsuitable for obtaining evidence of a pupil's ability to use diacritical marks.

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FACTORS OF LEADERSHIP AMONG SENIORS OF CENTRAL HIGH SCHOOL, TULSA, OKLAHOMA

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Editor's Note: Through selection and training the Secondary School is rich source of leaders. The author discusses the factors in leadership.

THROUGH their curricular and extra-class activities, the secondary schools constitute a rich field for the selection and training of leaders and potential leaders in the art and technique of responsible leadership in a democracy. Since many of these activities form the basis for adult citizenship, the schools have the opportunity of developing desirable social qualities and of curbing anti-social tendencies through appropriate guidance and training. Once we are able to associate successful leadership in the high school environment with certain characteristics and traits and have reasonable assurance that they carry over into adult life, we should be more successful in discovering leaders and potential leaders and in assisting them to plan their education and life work.

Many investigations have been reported on the various aspects of leadership. In the earlier discussions, such as those by Emerson and Carlyle, the author often detailed the characteristics to which he himself attributed the success of a selected leader.[1] Occasionally a modern writer employs this subjective method of approach, but he builds his data around individuals so selected as to eradicate all question as to their position as leaders. Although a constant source of inspiration, these studies are limited in significance by the fact they are highly subjective.

Others approach the study of leadership as an outgrowth of situations and circumstances, considering it as spontaneous and impromptu in origin and nature. Murphy, who used this technique, explains leadership as a result of sociological, rather than psychological factors.[2] Most prevalent method is comparison of leader with non-leader groups in regard to certain characteristics and traits.

Specific qualities studied have a wide range and include such items as character traits, intelligence, scholarship, achievement test scores, age, weight,

[1] Thomas Carlyle, *On Heroes, Hero-Worship, and the Heroic in History* (Boston: Houghton Mifflin Company, 1907).

[2] A. J. Murphy, "A Study of the Leadership Process," *American Sociological Review*, VI (October, 1941), 674–87.

height, sex, activities in and out of school, family relations, father's occupation, socio-economic status, and family income. Ages of subjects studied range from early childhood to adulthood.

Data for this study were gathered from the cumulative records of seniors who were graduated from the Central High School of Tulsa, Oklahoma, on May 31, 1940. These records represent a system of student accounting from the first grade through high school. In collecting significant data on characteristics and traits of student leaders, the writer selected achievement tests scores, intelligence tests scores, teacher personal rating of students, student leader records in curricular and extra-class activities, and height. Each student received from thirteen to twenty-seven subjective ratings by teachers on personality, leadership, and all-round promise items included in this study.

Using as subjects those seniors who completed six and only six semesters of work in this high school, 888 qualified from a total of 1,189 graduating in May, 1940. Of these 888 students selected for this study, 437 were designated as leaders and 451 as non-leaders. Bases for designation as leaders were: offices held as organization or club officials, awards, special recognition, officiating or participating in general assemblies, play participation, radio broadcasting, student assistantships, captaincy of the athletic teams, publications, and other important committee services.

Ten school supervisors were asked to concur in a plan of transmuting the points for honors earned as a leader into numerical scores. Cooperating in this plan were: principal, vice-principal, assistant principal, boys' counselor, dean of girls, sophomore, junior, and senior class directors, and supervisors of dramatics and activities. A printed form containing leadership items selected from the annual statistical report with spaces for ranking each item on a scale of five point intervals was submitted to the judges. As a result of this evaluation, 1,938 opportunities for leadership were selected for consideration in this study.

Records on height were obtained from graduation gown measurements. Heights of boys and girls were considered separately, since it was thought that sex might make a difference in this respect.

In selecting the group designated as leaders, the writer included all seniors who earned five or more honor points by attaining one or more of the leadership positions evaluated by the judges. Non-leaders were selected as those who failed to earn five or more points by this means.

Coefficients of correlation were calculated between the total leadership scores and the total scores on the eight items included in this study. Results are shown in Table 1.

It will be observed that leadership correlated .266 ± .031 with Stanford achievement scores, .279 ± .035 with Sones–Harry scores, and .203 ± .031 with the American Psychological scores. These correlations, while not significantly high, reveal a definite relationship between scores on achievement tests and leadership. Correlation of leadership with intelligence gave .218 ± .03 which, with the low probable error, would indicate that leaders are somewhat more intelligent than the group composing the regular student body.

TABLE I

CORRELATION OF LEADERSHIP PARTICIPATION SCORES WITH ACHIEVEMENT TESTS SCORES, INTELLIGENCE QUOTIENT SCORES, TEACHER RATING SCORES, AND HEIGHT FOR THE 437 LEADERS

(1)	Correlation (2)	Probable Error (3)
Stanford Achievement	0.266	0.031
Sones-Harry	.279	.035
American Psychological	.203	.031
Intelligence Quotient	.218	.030
Personality Rating	.307	.029
Leadership Rating	.391	.027
All-Round Promise Rating	.347	.028
Height—Boys	.039	.048
Height—Girls	—0.072	0.042

Correlations among leadership and personality rating, leadership rating, and all-round promise rating, resulted in .307 ± .029, .391 ± .027, .347 ± .038, respectively. These teacher rating correlations, with the low probable errors, would indicate that teachers are able to detect leadership traits with a fair degree of success.

For boys, correlation between height and leadership scores is negligible, and is indicative, with its high probable error, of little better than chance selection. In the case of girls, height correlated negatively with leadership, indicating that height in excess of average might operate against a girl's leadership success.

Aside from height, the general picture of high school leaders reveals the leader group as somewhat more intelligent and scholarly, with superior

rating in personality traits, when compared with the senior students who were not leaders.

In the correlations of Table 1, it will be observed that leadership is correlated directly with characteristics and traits of leaders. Comparison of leader with non-leader groups, with reference to characteristics and traits, is revealing as to the nature of high school leaders. Further study compares the 437 leaders with the 451 non-leaders with reference to characteristics and traits.

Table 2 contains mean scores, with probable error of mean, for the 451 of the non-leader group, the leader group of 437, and the upper quartile of 437 leaders. Mean comparisons with probable error were calculated from achievement tests scores, intelligence quotients, teacher personality ratings, and heights. From Table 2 it is seen that the entire leader group mean score on the Stanford test was 4.10 points higher than the non-leader group and that the upper quartile of leaders was 7.79 higher than non-leaders. On the Sones–Harry test, the entire leader group scored 13.70 points higher than non-leaders, while upper quartile scored 36.40 higher than non-leaders. On the American Psychological, the entire leader group scored 9.05 higher than non-leaders, and the upper quartile was 15.29 points higher than non-leaders. On intelligence tests the leader group scored 5.65 higher than non-leaders, and the upper quartile 10.6 higher than non-leaders.

TABLE II

COMPARISON OF MEANS OF NON-LEADERS, LEADERS, AND UPPER QUARTILE OF LEADERS

(1)	Mean of Non-Leaders (2)	P. E. M (4)	Mean of Leaders (4)	P. E. M (5)	Mean of Upper Quart. of Leaders (6)	P. E. M (7)
Stanford Achievement Test	91. 35	0. 0355	95. 45	0. 101	94. 14	0. 651
Sones-Harry Test	167. 90	2. 48	181. 60	2. 15	204. 30	4. 51
American Psychological Test	78. 30	0. 70	87. 34	0. 71	93. 59	1. 44
Intelligence Quotient	107. 06	0. 44	112. 71	0. 42	117. 66	0. 86
Personality Rating	3. 18	0. 012	3. 49	0. 012	3. 63	0. 026
Leadership Rating	2. 95	0. 011	3. 31	0. 011	3. 51	0. 026
All-Round Promise Rating	3. 11	0. 013	3. 40	0. 013	3. 59	0. 029
Height—Boys	70. 37	0. 013	70. 64	0. 13	71. 04	0. 20
Height—Girls	65. 42	0. 009	65. 28	0. 10	65. 60	0. 20

Teacher rating scores on personality rating scores show the same consistent increase from non-leaders to the upper quartile of leaders. In height as a factor of leadership, there is less significant difference.

Findings of the Tulsa study, when compared with the results of similar investigations, were substantially in agreement. An examination of investigations of other phases of leadership characteristics and traits further emphasized that leaders surpass non-leaders on additional qualities studied. Following is a summary of the findings of the Tulsa study and the results of other investigations.

THE TULSA STUDY

1. High school leaders excel non-leaders in scholarship and intelligence.
2. Leaders rate higher on personality traits.
3. When the upper quartile of leaders are compared with the general group of leaders, the select leaders are significantly higher in scholarship, intelligence, and personality traits.
4. Teachers are able to detect, with a fair degree of accuracy, personality traits of leaders.
5. Height is not a significant factor of leadership.
6. It was observed that a substantial proportion of the non-leaders ranked high in characteristics and traits studied. To the administrator and teaching staff these individuals became a challenge.
7. Cumulative records should be made more accessible to those personnel staff members and advisors who are responsible for assisting students in planning curricular and extra-class activities.
8. It is recommended that the supervisory staff of the high school act as a clearing house in setting up a unified plan to train leaders and potential leaders in the art of leadership.

OTHER INVESTIGATIONS

1. Reported scholarship and intelligence as significant factors in successful leadership.
2. Desirable personality traits are strongly emphasized as qualities of leaders and potential leaders.
3. Height of high school leaders is not a signficant factor influencing success in leadership.

4. There is a tendency for leaders to be somewhat younger than their groups.

5. Investigators did not agree on neurotic tendency as a factor influencing success in leadership.

6. Studies on socio-economic status showed that leaders are more likely to emerge from families in the upper income brackets.

7. A larger percentage of leaders attend college than of non-leaders.

8. Leaders have more chance of graduating than non-leaders and of remaining in college a longer length of time.

9. Follow-up studies revealed that leaders in high school are more likely to be leaders in college, to earn larger salaries in business, and to be more active in outside community interests.

10. Leaders follow more hobbies and outside activities than non-leaders.

11. There is a definite trend toward detecting and training leaders in the high school for leadership service.

TRENDS IN HIGH SCHOOL SUPERVISION

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Editor's Note: In a rapidly changing social scene such as that with which the schools today are faced the need for adequate educational leadership is great. The author surveys certain practices in this area at the secondary school level.

A CONSTANT re-examination of the trends in high-school supervision, or in any supervision for that matter, seems essential in order that we may be alive to the advantages and possibilities of high-school supervision that is democratic in character. Although much has been written and said about the need of more democratic teaching procedures in our schools, little has been done to secure more information regarding the possibilities and desirability of democratic supervision.[1] What is more, little of practical value has been published that is of specific value toward offering remedial suggestions in achieving the desired end.

Comprehensive information concerning high-school supervision has been lacking for some years. Six years ago the writer gathered considerable data which school people considered valuable for the purpose of securing democratic procedures in this field. To this end another study has been made, or, we might say, the same study has been continued, supplementing and expanding the information gathered heretofore.

It would seem extremely difficult to secure the information desired unless a type of questionnaire were used.[2]

Considerable divergence of views concerning supervision is frequently found. The viewpoints are somewhat set off from traditional views in the questionnaire. Current literature on the subject served as a basis for this arrangement.

Instruction is the most important activity going on in the school, and the improvement of instruction is the most important aim which a supervisor should have in mind. A good practical definition of supervision might be stated as "the technique of improving instruction".

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[1] Barr, A. S. and Burton, Wm. H. *Supervision of Instruction.* New York: D. Appleton and Co., 1926.

[2] All original questionnaires that contributed to this study are on file together with the tabulations.

TABLE I

DISTRIBUTION OF RESPONSES

Questionnaires were received from:	1936	1942	Total 1936–1942
Henry Clay Senior High School	30		
Lexington Junior High School	21		
Morton Junior High School	21		
University High School	9		
Pleadome High School	10		
Bryan Station High School	8		
Dunbar High School	15		
Olive Hill High School		5	
Maysville High School		8	
West Liberty High School		12	
Rowan County High School		14	
Winchester High School		19	
Paris High School		7	
Carrollton High School		12	
Mt. Sterling High School		12	
Bath County High School		9	
Montgomery County High School		8	
Totals	114	106	220

Since experience has been declared the best teacher, it seemed logical that years of experience should help give value to the teachers' reactions.

In this type of questionnaire, provision was made for added items that might be suggested by those participating.

TABLE II

YEARS OF EXPERIENCE

	1936 Group	1942 Group
Average Elementary School Experience	4.3	2.6
Average Secondary School Experience	10.99	7.12
Average Supervisory Experience	.73	.85

TABLE III

SEX DISTRIBUTION

	1936	1942
Men	19	38
Married Women	15	28
Single Women	68	38
Unclassified	12	2
Total	114	106

TABLE IV

DISTRIBUTION OF SUBJECTS TAUGHT AT SOME TIME OR OTHER

Subject	Number Teaching It	
	1936	1942
English	43	38
Mathematics	37	26
Science	24	25
History	22	23
Latin	18	8
Social Science	11	12
Home Economics	11	8
French	11	5
Geography	8	3
Civics	6	0
German	4	0
Industrial Arts	4	2
Commercial	4	7
Physiology	4	0
Spanish	3	2
Art	2	0
Music	2	3
Economics	2	2
Physical Education	2	1
Agriculture	1	7
Sociology	1	1
Occupations	1	3
Greek	1	0
Substitute	0	1
Health	0	1
Education	0	1

In 1936, fifty-seven out of 114 had no elementary school experience. One hundred had no supervisory experience, while 14 did have.

In the 1942 group eighty-nine had no supervisory experience, while 17 did have. The 1942 group included 72 who had been supervised and 19 who had not been supervised. Fifteen failed to answer either way.

The average college attendance for those reporting in 1936 was 3.4 years; for those reporting in 1942, it was 4.23 years.

The average years of being supervised for all amounted to 5.03 in 1936; for those in 1942, it was 5.12 years.

TABLE V

EXPERIENCE OF HAVING BEEN SUPERVISED

	1936	1942	Total
Have Been Supervised At Some Time	65	72	137
Have Not Been Supervised At Any Time	45	19	64
Failed To Respond	4	15	19

Someone has said that "the leading test of successful supervision is found in the attitude of the teacher towards the supervisor". Psychologically speaking, traits found in supervisors readily develop attitudes within the supervised. The trait list assumed in this study was taken from Charters and Waples,[8] with instructions in the questionnaire to supplement the list with other traits. Of the 28 traits that might characterize the secondary school supervisor, six received major consideration. The eight highest are listed in order as follows:

TABLE VI

ANALYSIS OF TRAITS

Trait	1936	1942
Good Judgment	93	82
Co-operation	76	70
Consideration	72	73
Breadth of Interest	62	66
Honesty	62	57
Leadership	60	64
Scholarship	52	------
Magnetism	48	47
Attractive Personal Appearance	------	49

It should be noted that with the 1942 group "scholarship" gave way to "attractive personal appearance". Is this significant? Generally, however, traits follow the same sequence in both groups.

It is to be noted that these traits paint a picture of a very definite personality. The supervisor should be one who has high intelligence, widespread interests, together with the initiative and resourcefulness to push plans to completion, yet who is considerate of others and able to co-operate with them. Several people indicated that more traits might characterize their supervisor, yet it is the OUTSTANDING traits that mark the individual for the place.

The selected traits, designating the type of person high-school teachers desire as supervisor, indicate that the one who knows human relations rather than subject-matter, one who makes a friend rather than a "boss", is a desirable supervisor.

[8] Charters, W. W. and Waples, Douglas. *Commonwealth Teacher Training Study*. Chicago: The University of Chicago Press, Chicago, Ill., 1929.

TABLE VII

SEX OF SUPERVISOR

	1936	1942	Total
Should Be Man	26	40	66
Should Be Woman	16	3	19
Sex Immaterial	67	63	130
No Reply	5	0	5

The data might indicate that there is a slight preference for male supervision.

RELATIONSHIP OF PRINCIPAL TO SUPERVISOR

In 1936, forty-six designated that the traits of a good principal and of a good supervisor were the same. In 1942, fifty-six reacted the same way.

As between a supervisor who is a "boss" and one who is a helpful friend only, forty-six of the "1936 group" indicated that they could best confide their difficulties to the latter. Twenty-eight of the "1942 group" indicated their agreement.

It appears that at least one-half (57) of the group in 1936 think the principal should have ultimate authority in the building. Forty of the 1942 group approved of this decision also. There is a slight alteration noted in 1942. The other reactions under this rubric are inconsequential.

TABLE VIII

GENERAL VS. SPECIAL SUPERVISION

	1936	1942
Supervisors Should Be Subject-matter Specialists	36	25
Supervisors Should Be Educational Technicians	18	18
Should Have Both Types	59	63

TEACHER DIFFICULTIES

The choice whether the teacher's difficulties lie in the field of the technician or in the field of subject-matter was indicated decisively in both studies. One-hundred-eight in 1936 and one-hundred-two in 1942 (in the

light of their own difficulties) stated that the teacher's difficulties lie in the field of the technician. Only a total of three persons in both studies reacted otherwise. This, indeed, has an important bearing on the training and on the type of supervision desired.

SUPERVISOR-TEACHER RELATIONSHIP

The opinion expressed under this rubric was also decisive. One-hundred-six to seven in 1936 indicated that the supervisor should be an *advisor* only; in 1942 the score was ninety-five to eleven on the same issue. This is in accord with the most advanced theory of today.

TABLE IX

SUPERVISOR–SUPERINTENDENT RELATIONSHIP

	1936	1942
1. Supervisors Should Make Reports Involving Teaching Efficiency to the Administrator	89	80
2. Supervisor Should Not Make Reports	15	10
3. Teacher's Attitude Toward Supervisor Would Be the Same in Either Case	28	17
4. Teacher's Attitude Would Not Be the Same	46	50

TEACHER RATING

In the 1936 study, eighty teachers indicated that the supervisor should rate the teachers and report only to them for purposes of teacher guidance and improvement; in 1942, eighty-five teachers approved of this item. In 1936, forty voted that the supervisor should *not* rate teachers for salary, tenure, transfer, and advancement; in 1942, twenty-three decided that way. In 1936, twenty-three thought that supervisors should rate teachers for the purposes indicated, while in 1942, twenty decided that way.

CURRICULAR ACTIVITIES

A score of 109 to 1 in 1936, and 97 to 11 in 1942, would decisively indicate that the supervisor should function on a committee in making the curriculum, outlining the detailed course of study, and selecting the text-books, rather than for him to have complete authority in these matters. One person in 1936 and 11 in 1942 believed that the supervisor should not take any part in these activities.

TABLE X

NEED FOR SUPERVISION

	1936	1942
There Is A Marked Need For Secondary School Supervision	65	75
There Is No Marked Need For Secondary School Supervision	39	23

The result on these items is both surprising and interesting to the writer. If these results should prove generally valid, it speaks well for the rapid growth of secondary education. They indicate a felt need, striving, and an open attitude.

TABLE XI

SCHEDULE

	1936	1942
Supervisor Should Follow An Announced Schedule	31	34
Supervisor Should Follow An Unannounced Schedule	73	67
Supervisor Should Come Only at the Call of the Teacher	7	3

TABLE XII

TEACHER IMPROVEMENT

Professional Activity	Rank Given			
	I	II	III	IV
1. Supervision (including visits and conferences)	38 (43)	53 (30)	10 (22)	5 (7)
2. Organized Professional Work (summer school, correspondence)	36 (51)	33 (18)	32 (26)	5 (6)
3. Professional Reading	22 (9)	17 (33)	50 (31)	17 (24)
4. Institutes, Teachers' Meetings	10 (3)	3 (17)	14 (17)	79 (60)

* Figures in Parentheses are figures for 1942.

Supervision and organized professional work are close in their count as to what the secondary school teacher thinks with reference to teacher improvement. However, if we take the first and second rankings of supervision and compare them with the first and second rankings given organized professional work, the score stands 91 to 69 in the 1936 group, indicating some additional confidence in supervision. The 1942 group, however, gives these two items almost equal ranking.

GENERAL COMMENT

The school has one business: to instruct its pupils. Education is becoming scientific, i.e., diagnosis and prescription are replacing "patent medicine" doses in education. The supervisor is in reality a human engineer. The supervisor needs to obtain the co-operation of the teachers. To do so he needs to convince them that he is competent by giving them real aid. It is, furthermore, essential that the supervisor convince his teachers that he is sympathetic, that he understands their problems, and that he desires to help them.

High school teachers do not ask agreement on everything. The studies seem to bear out the fact that "when two men agree on everything, one is unnecessary" and progress is thwarted.

The writer's activity in these studies has tended to modify his concept of secondary school supervision. The attempt was made to discover trends relative to secondary school supervision. The studies make no pretense to general validity for their findings, although the data seem to indicate specific trends. All in all, the questionnaire has served its purpose well, revealing certain items as fertile soil for further investigation and branding others as unimportant or academic.

If these two studies covering an interval of six years should prove to be a true cross-section of the sentiments and convictions of our high-school teachers generally, then supervisors with a "super" *vision* would still be welcome. "Snoopervisors" are anti-democratic, not even being worthwhile as so-called "necessary evils".

EDITORIAL

FUNCTIONAL PROBLEM SOLVING

MANY students on the graduate campus and many field workers, as well as some professors, express apprehension that, like oil, the supply of research problems may soon be exhausted. They point out that it hardly seems possible each year to find new problems for 12,000 Masters' and 3,000 Doctors' candidates. Hypercritical observers of graduate work have commented that already many thesis projects are synthetic substitutes for genuine problems, "assigned" to provide formal training in techniques of research rather than to meet felt needs and to resolve difficulties.

In the field of education, however, like any applied field of knowledge, there is no dearth of unsolved problems to which may be applied one or more of the generally recognized methods of investigation—historical, survey, experimental, and case-clinical. Historical events have a way of transpiring day by day. A survey of status is up-to-date only at the time when made. Most experiments require verification under different conditions. Hardly a good beginning has been made in the schools toward utilization of case and clinical techniques.

In some graduate departments of education, however, functional problem solving has been handicapped by too narrow a definition of research and of thesis specifications. It is true that other graduate institutions have defined too loosely and too liberally the investigational projects accepted from Masters' and Doctors' candidates. There is no reasonable excuse for poorly planned or loosely reported educational studies. However, especially at the Master's level, where most of the candidates are field workers, a broadened concept of problem solving is appropriate, and is actually implied in even the labels for graduate studies in some schools; for example, "paper" or "essay" at the Master's level, and "document," "project," or "field study" at the Doctor's level. Of course, the all important consideration is whether a functionally sound solution of a genuine problem is intelligently sought and clearly reported, rather than whether the project meets all of the canons and rigid controls of experimental research in the physical sciences. Four illustrations of this concept, as applied at the Master's level, are in order.

The literature of education is now so extensive that literally hundreds of carefully synthesized reviews of the evidence on specific problems would be useful, even though effective summarizing work has been done in the *Encyclopedia of Educational Research* (1941) and periodically in the *Review of Educational Research*. Such reports should employ a topical organization and should avoid the "running-bibliography" treatment of the studies covered.

The development, preparation, and tryout of a textbook, course of study, workbook, or laboratory manual represent one of the most practical types of field problems. When a report of such a project is presented to meet thesis requirements, it should include a careful survey of related materials, community setting, and procedures employed. At the graduate level a well-reasoned account of the problem-solving approaches employed is at least as important as the end-product in the form of the text, course of study, workbook, or manual.

The development and empirical evaluation of a teaching, administrative, or supervisory plan present a real challenge to the field worker. The report should include a critical treatment of the sources or factors that entered into the development and evaluation of the particular plan, including historical background, current practice or conditions, expert judgment or authoritative opinion, contemporary theory, related literature or investigational evidence, careful observation, and experimental tryout.

A thesis may well present a piece of creative work of both intrinsic merit and educational significance in such fields as art, music, and literature. The report of the project should include an analysis of the development and educational significance of the particular piece of creative work; for example, a painting that interprets Mother Goose verse to young children should have an accompanying essay reporting the psychological problems of interpretation, the methodological techniques of composition, and the possibilities for correlation of art and children's literature.

These suggestions extend the area of educational problem solving beyond the narrower limits and more rigid controls of physical science, but, in common with all scientific endeavor, emphasize reflective thinking and insight in formulation of the problem and hypothesis, selection of procedure, collection of data, analysis of evidence, interpretation of conclusions, and organization of the report.

CARTER V. GOOD.

REVIEWS

Address books to be reviewed and other communications to A. S. Barr, Department of Education, University of Wisconsin, Madison 6, Wisconsin.

AVERILL, LAWRENCE A., *Introductory Psychology*, New York, Macmillan Company, 1943. Pp. xi + 564.

This elementary text represents another attempt to make the introductory course in psychology more functional. It was written as a "psychology of you" and purports to help the student answer questions such as these: What do you want of life? How will the habits you are forming aid or hinder you in your quest? How powerful is the role that your mental attitudes will be playing as you proceed? How can you learn to study economically? Can you detect the difference between true fatigue and treacherous pseudo-fatigue? What is sound thinking and what is wish thinking and how will they affect your achievements? Can you detect propaganda? Are you meeting the obstacles in your everyday experience which thwart and discourage you? What are the secrets of building a character that will bring lasting satisfaction? Are you constructing the blue prints of a healthy mind?

The information that the author believed students would need in order to "attempt to answer these questions" is included in some twenty chapters on topics like motivation, habit formation, techniques of study, feelings and emotions, thinking, heredity and environment, personal adjustment, choosing a vocation and developing a healthy mind. Not only the subject matter of the book, but the general method of exposition is a far cry from other elementary texts such as Dashiel's "Fundamentals of General Psychology" (1937) or even Ruch's "Psychology and Life" (1941). In general Mr. Averill's writing style is very popular, with "folksey" headings such as "Can you keep your mind from wandering?" "The world of work is no veil of tears!" "Heredity should not be a scapegoat!" "Do we need our senses, brain, muscles?" (sic. p. 51) The bibliographies at the end of each chapter are headed "What Others Say" and include sections for 1) social research, which usually means research in psychology, 2) drama, 3) poetry, 4) fiction, and 5) essays. The references to the psychological literature are few and the body of the text includes little that would be recognized as objective psychological data. The author was more disposed to illustrate his argument with anecdotes and references to the non-scientific literature than he was to set forth the evidence from which his generalizations were inferred.

The organization of the book seems to have been well thought out. Each chapter includes a three or four page section called "What's ahead in Chaper ____", then the body of the chapter, and a concluding series of exercises, "to help you learn." The bibliography has already been mentioned. The section that purposes to

help the students learn includes not only a few of the conventional essay type questions but in many instances suggestions for some student activities. These activity exercises are liberally sprinkled throughout the body of the text as well as at the end of each chapter. In some instances they impressed the reviewer as being suggestions which few young people would act upon. One of them urged the student to list the pressing problems that people are facing today (p. 274).

It was a bit hard for the reviewer to be absolutely certain about the population to which this text was addressed. In the preface the author stated that he had written for beginning students of psychology but he also spoke of adolescents. He went on to say, that the persons who would read the book had also "drawn aside the dusty curtain of the past and had stood beside Darius, Pericles, the Caesars, Charlemagne, Elizabeth, Washington, Bonaparte, Victoria." They had "delved into the cultures of Orientals and Occidentals; of Moslems, Hindus, Christians, Jews." (p. vii). This certainly does not sound like anything that high school boys and girls have done but, on the other hand, the author's general style of writing and his type of illustration and metaphor seemed too immature for college students. As a matter of fact, Mr. Averill seemed consciously to be writing down to his readers as if he realized that they would have trouble understanding what he was trying to say and that they needed, figuratively, to be taken up on an author's lap.

University of Chicago

STEPHEN M. COREY.

MILLER, WARD IRA. *Democracy in Educational Administration: An Analysis of Principles and Practices.* New York: Bureau of Publications, Teachers College, Columbia University, 1941. Pp. x + 116.

ALFORD, HAROLD D. *Procedures for School District Reorganization.* Contributions to Education, No. 852. New York: Bureau of Publications, Teachers College, Columbia University, 1942. Pp. vii + 164.

MILLARD, D. BELL, *A Plan for the Reorganization of Administrative Units for the Schools of Nebraska.* New York: Bureau of Publications, Teachers College, Columbia University, 1941. Pp. x + 105.

HAROLD H. PUNKE, *Law and Liability in Pupil Transportation.* Chicago: University of Chicago Press, 1943. Pp. iii + 291.

All four of the research studies just listed deal with important phases of school administration. The first three studies named reach beyond the statistical aspects of the respective problems to delve into procedures whereby changes in educational practice are achieved or not achieved in local situations. It is encouraging to note an increasing number of researches grappling with the elusive factors of community sentiment, partisan maneuvers, and group leadership which are operative in local situations. Gradually these studies are accumulating valuable information and generalizations about the role and techniques of community leadership.

Democracy in Educational Administration might be classed as a documentary study. Part One, entitled "The Challenge of Democracy to Educational Administration," deals with the democratic state and its relation to the schools, with certain developments which are affecting materially the pattern of educational administration, and with a brief review of significant studies dealing with one or more aspects of the cooperative management of our schools. Part Two, entitled "The Democratic Process and Educational Administration," gives attention to (a) examination of the principles that have been stated and their reformulation for further study of the problem, (b) examination of the basic issues and problems involved in the light of the principles accepted, (c) clarification of the aims and values of democratic administration and the indication of certain dangers, and (d) determination of the characteristics of acceptable programs. Five criteria for the evaluation of acceptable principles and six principles are stated and developed. These principles are then applied to eight basic issues. The entire treatment is a helpful elucidation of the problem.

The author of *Procedures for School District Reorganization* stated four purposes in making his study, namely (a) to contribute to the cumulative evidence available for a better understanding of the broad and complex problem of school district reorganization, (b) to present the provisions of school laws in a logical order for the benefit of laymen, legislators, and others, (c) to discover why school district reorganization has not followed favorable legislation in certain cases, and (d) to formulate principles dealing with the organization of new administrative structures. State laws of the forty-eight states, court decisions, school board minutes, petitions, letters from patrons, extracts from school meeting minutes, newspaper articles, and interviews were utilized in obtaining the data. Detailed case studies were made of reorganization efforts in Ashley County, Arkansas, and Mexico, Oswego County, New York. The author drew eleven conclusions from his study, many of which point to the lack of state and local leadership, the ambiguity of the laws, and the complicated procedures. This volume should be of definite help to those concerned with an improvement of the procedures for school district reorganization.

Bell's study of school district reorganization in Nebraska consists primarily of an analysis of basic principles and generalizations from previous researches, an analysis of the social, economic, and geographic factors in Nebraska, the present status of school finance and school district organization in that state, and the formulation of guiding principles for reorganization which would be applicable to Nebraska. The study is well done as far as it goes. The reviewer was somewhat disappointed that the specific proposals for district reorganization in Nebraska stopped with the guiding principles. No doubt the application of the principles to an entire state entails some hazards and is too large a task for one doctor's thesis, especially if added to what the author has already done, but some specifics would have been helpful. It is hoped that at another time the author or some one else may carry this study further.

The rapid expansion of pupil transportation makes *Law and Liability in Pupil Transportation* a timely volume. The author of this research has attempted to present the principles of common law

which have emerged through court rulings. All pertinent cases which have come before our higher state and federal courts have been included in the analysis. An effort was made to present a clear, detailed analysis of the scope of power and duty of school authorities in providing transportation, the recourse of dissatisfied persons upon failure to provide adequate or safe transportation, and the social implications of judicial decisions. The seven chapters of the book are entitled "Authority and Responsibility of School Officials in Providing Transportation," "Discretion of School Officials in Providing Transportation," (two chapters), "Contracting for Pupil Transportation," "Recovery by Parents for Transportation Provided," "Care, Injury, and Tort Liability in Pupil Transportation," and "Social and Educational Implications of Court Rulings on Pupil Transportation." The author has done an admirable piece of work. The chapter summaries are particularly helpful. Every school administrator who deals with pupil transportation should have a desk copy of this book.

HENRY J. OTTO.

University of Texas

WATKINS, JOHN GOODRICH. *Objective Measurement of Instrumental Performance*. New York: Bureau of publications, Teachers College, Columbia University, 1942. Pp. xv + 88.

This is a most valuable study in the construction of an objective standardized test of cornet performance validated by modern psychrometric methods. It explains the construction of the test and gives valuable suggestions for solving the problems involved in building objective measures of musical performance and in determining standards of difficulty. The purpose of the study is to construct an objective test to measure Sight and Practiced Performance on the cornet, and to determine the relation existing between sight reading ability and technical skill after various periods of study.

In constructing the performance test a set of melodic exercises was written ranging in difficulty from the easiest type to one of professional grade. The various symbols of musical notation were introduced according to the order in which they are learned, as indicated by a preliminary study of twenty-three cornet methods. Sixty-eight melodic exercises were administered to a group of 105 cornet students representing various levels of ability. The difficulty of playing each exercise with any given number of errors was computed. From the sixty-eight exercises two equivalent sets of fourteen each were selected in which each exercise increased over its predecessor by an approximatly equal increment of difficulty. Based on the scores made by the 105 cases in the preliminary testing, these forms (A and B) correlated .982 with each other. The appendix contains both forms of the completed test.

The author has shown that objective measurement of musical performance is possible and his methods may be found valuable in the building of other research instruments in this field. The tests themselves should prove useful measures of achievement for the research worker in music education, for standardizing the grading of music, and for the cornet teacher.

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Research News and Communications

Address all research news and communications to Carter V. Good, Teachers College, University of Cincinnati, Cincinnati, Ohio.

DOCTORS' DISSERTATIONS UNDER WAY IN EDUCATION, 1943–1944

CARTER V. GOOD
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THIS is the fourteenth annual list of Doctors' dissertations under way in education to be published in the January number of the *Journal of Educational Research*. The present list includes only the titles that have not been printed in the January, 1941, 1942, and 1943 numbers of the *Journal*. Therefore, in order to make a reasonably complete canvass of doctoral studies under way at present, it is necessary to examine these four lists, 1941–44.

Completed dissertations may be located through canvassing the annual bibliographies of research in education, published by the United States Office of Education, although publication of this service has been suspended for the duration of the war period, and through *Doctoral Dissertations Accepted by American Universities*, published annually by the H. W. Wilson Company.

In all cases the name of the student, thesis title, and graduate institution are given, and in most instances the major adviser or advisory committee is listed. No differentiation is made in this compilation between Ph.D. and Ed.D. problems.

The institutions that have sent titles for inclusion in the 1943–44 list are: California (Berkeley), California (Los Angeles), Catholic University, Chicago, Cincinnati, Colorado, Colorado State College of Education, Columbia, Cornell, Denver, Fordham, George Washington, Harvard, Illinois, Indiana, Iowa, Iowa State, Johns Hopkins, Loyola (Chicago), Marquette, Michigan, Minnesota, Missouri, Nebraska, New York, North Carolina, Northwestern, Ohio, Oklahoma, Pennsylvania, Pennsylvania State, Pittsburgh, Saint Louis, Southern California, Stanford, Syracuse, Temple, Texas, Washington (Seattle), Western Reserve, Wisconsin, and Yale.

In the topical index, most of the titles are listed under more than one heading; for example, "A History of Clark College" appears under both "history of education" and "higher education."

The effect of war conditions on the enrollments of graduate schools has been reflected again this year in a shorter list of new dissertations under way. Certain schools have reported no new doctorate problems in progress.

The second division of the topical index lists a group of problems related to the war effort. A similar list was included a year ago in the dissertations under way.

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NEW 1943–44 LIST

1. Abernethy, Robert R. "Teacher Tenure in Pennsylvania." New York. Myers.
2. Addicott, Kenneth K. "Exploration of Educational Possibilities of Portable Museums among Army Personnel." Columbia. Hallenbeck.
3. Adell, James C. "Opportunity of High-School Pupils in Cleveland, Ohio, to Achieve Objectives of General Education." Columbia. Powers.
4. Albright, Arline M. Harms. "A History of the Education of the Hypacusic from the Talmud to 1943." Marquette. Vander Beke.
5. Allen, D. M. "Personnel Program in Mansfield State Reformatory." Ohio. Stone.
6. Allen, Homer. "Safety in Adult Activity." New York. Nash.
7. Anderson, Florence. "Children's Out-of-School Reading." Temple. Seegers.
8. Andrews, James F. "Socio-Economic Correlates of Vocational Guidance." Stanford. Kefauver and Hilgard.
9. Angel, Clarence. "A Survey of Wooster (Ohio) Youth and Its Contribution to the Establishment

of Better Community Processes of Life-Education." Stanford. Bell and Kinney.

10. Angell, Warren. "The Formulation of a Plan for the Improvement of Choral Music in the Southern Baptist Church." Columbia. Burrows and Church.
11. Angerer, C. L. "A Study of How Young Men Who Have Had Vocational Agriculture in High Schools in Oklahoma Are Becoming Established in Farming." Cornell. Stewart.
12. Antell, Henry. "Guiding Principles for Improving Teachers in Service." New York. Speer.
13. Appleton, Darwin B. "Measurable Associates of Failure in Radio Code Reception and Transmission." Columbia. Pieper.
14. Arey, Charles K. "The Preparation of a Guidebook for Use by Elementary Teachers in Aviation Education." Columbia. Craig.
15. Arnold, Gwen F. "A Study of the Mental Capacities of Children Handicapped by Cerebral Palsy." Wisconsin. Little.
16. Asfahl, William D. "Increasing School and Community Interaction." Columbia. Norton.
17. Averill, Forrest C. "Public Education in Grand Rapids." Michigan. Moehlman.
18. Axelrod, Hyman C. "Bilingualism and Its Relation to Personality." Columbia.
19. Baker, S. Harry, Jr. "Management Practices in Large High Schools." George Washington. Fox.
20. Bakst, Eloise B. "Geometrical Constructions." Columbia. Clark and Kasner.
21. Barry, Eleanor E. "The Success of College Students after Reinstatement." New York. Myers.
22. Bartlett, Roland O. "Factors in Learning the Meanings of Common Words in Reading Materials." Chicago. Gray.
23. Barton, Dorothy J. "A Study of Personality as Revealed in Written Compositions." Syracuse. Hartley.
24. Baum, Alvan. "Activities of the State Department of Public Instruction in Promoting Vocational Guidance in the Junior High Schools of Pennsylvania." New York. Hoppock.
25. Beard, John L. "A Study of the Duties Performed by College Administrators." Texas. Ayer.
26. Beasley, Antoinette. "Teacher Education and the Core Curriculum." North Carolina. Ryan.
27. Becker, Harry A. "Standardized Testing Programs in the Senior High Schools of Connecticut." Yale. May and Hill.
28. Becker, Helen R. "A Study of Factors Involved in Helping Student Teachers at Michigan State College to Understand Kindergarten Children." Columbia. Stratemeyer.
29. Benumof, Reuben. "General Physics and Modern Electrical Communication." New York. Pieper.
30. Berg, Gunnar H. "The National Training School for Scout Executives." Columbia. Fretwell.
31. Berlin, Lewis L. "The Health Teachings of the Old Testament." New York. Hamilton.

32. Biemesderfer, Daniel L. "The History of Millersville State Teachers College in Pennsylvania." Temple. Owen.

33. Bills, Mark W. "A Comparison of the Relative Equality of Educational Opportunity in Certain Representative Michigan Counties." Michigan. Moehlman.

34. Bingeman, Joseph Wade. "The Reorganization of the Schools of Lancaster County, Pennsylvania, under a County System of Control and Support." Temple. Owen.

35. Bishop, Amy I. "Reflections of Contemporary Problems in the American Theater, 1865–1900." Columbia. Smith and Curti.

36. Bishop, Kay V. "The Role of the Classroom Teacher in Public Relations." Harvard. Simpson.

37. Bishop, Miriam. "Measuring Aptitudes for Arithmetic in Grade One of the Elementary School." Pittsburgh. Olander.

38. Black, John H. "Improving the Public Relations of the School by Personal Contacts of the Principal with His Co-workers and Fellow Citizens." Columbia. Elsbree.

39. Bochner, Ruth. "A Study of Personality Traits before and after Thyroidectomy." Columbia.

40. Boeker, Mary D. "Teaching of Pre-Calculus College Mathematics." Columbia. Clark.

41. Bonniwell, Bernard L. "A Study of Learning Differences Involved in Reading Music Notation When Using a Five-Line Staff and When Using a Six-Line Staff." Pennsylvania. McMullin.

42. Boone, Elwood B. "Recreational and Non-Recreational Interest Interrelationships." Michigan. Hughes.

43. Bovingdon, John. "Ideological Tendencies in Congressional Thinking Capable of Affecting American Participation in a World-Wide Collective Security Program." Columbia. Brunner.

44. Boyd, Katherine. "A Study of Runs of American Plays in London and British Plays in New York to Find Common Elements of Success and Failure." Columbia. Smith.

45. Bragg, L. A. "A Study of Local Administrative Units and Attendance Areas for the Schools of Nebraska." Colorado State College of Education. Troxel.

46. Brewer, Wallace. "History of Church Colleges in Oklahoma." Oklahoma. Balyeat.

47. Brigham, Robert I. "The History of Negro Education in Missouri." Missouri. Drake.

48. Britton, Ernest K. "Improvement of Educational Opportunity in Illinois." Columbia. Mort.

49. Brown, Florence R. B. "A Plan for Better Coordination of Training Given to Students in the Fayetteville State Teachers College." Columbia. Hallenbeck.

50. Brown, Milton W. "Standards for School-Building Construction Required by State Regulation." Chicago. Reavis.

51. Brumbaugh, Lewis H. "History of the Church of the Brethren in the United States." Pittsburgh. Franklin.

52. Buckey, Nellie. "A Study of the Education of Home-Economics Teachers with Reference to Selected Social and Economic Problems." Columbia. Evenden and Locke.

53. Butterfield, Clair Joseph. "The Effect of a Knowledge of Certain Grammatical Elements on the Acquisition and Retention of Related Punctuation Skills." Iowa. Greene.

54. Cable, Kenneth D. "The Administration of the Adjustment on Conduct Problems in High School." Illinois. Griffith.

55. Cairncross, Margaret. "The Professional Status of Faculty Members in Liberal Arts Colleges of Selected Universities." Syracuse. Hilton.

56. Callicutt, Dorothy Hinds. "A Study of the Socio-Economic Status of Puerto Rican School Children." Texas. Manuel.

57. Carlson, Stella Lucile. "Personnel Work." Washington (Seattle). Stevens.

58. Carter, Elwyn. "A Qualitative Study of the Values and Methods of Operation of Choral Groups Functioning in Commercial and Industrial Companies." Columbia. Mursell.

59. Cass, John C. "Factors Common to Situations in Which Beginning Teachers Fail." Harvard. Brewer.

60. Chamouloud, Muriel. "A Comparison of Social Adjustment and Phantasy Production in Response to Differently Structured Test Situations." Columbia. Symonds.

61. Chew, Tobias. "Development of Early American Spellers." Pittsburgh. Nietz.

62. Chu, Buoy Mun. "State Policies and Programs in the Certification of Teachers in California from 1890–1940." Stanford. Almack.

63. Chute, Oscar M. "A Study of the Improvement of Student Teaching in a Teachers College." Illinois. Reeder.

64. Clift, Virgil. "Study of Negro Teacher-Education Institutions in North Carolina, in the Light of the Democratic Ideal." Ohio. Anderson.

65. Climenhaga, Asa W. "A Comparative Study of Administrative Practices in Four Denominational Colleges under a Denominational Board of Education." Syracuse. Smith.

66. Codwell, John E. "Motor Performance among Pure and Mixed Negroes." Michigan. Hughes.

67. Cole, Dorothy M. "Function of Women Physical-Education Teachers in the Secondary Schools of Pennsylvania." New York. Nash.

68. Coleman, Mary Elizabeth. "The Development of the Abilities Involved in Comprehension in Reading throughout the Elementary School." Chicago. Gray.

69. Collins, Evan R. "The Training of Teachers in Universities." Harvard. Holmes.

70. Conn, Arthur E. "Personal Insurance: A Study of the Human Risk Problem." New York. Tonne.

71. Conner, Jay Davis. "The Effect That a Program of Instruction to Parents Has upon the Achievements of Their Children in School." Southern California. Lefever.
72. Cooper, Dan H. "A Critical Evaluation of the Surveys of City School Systems since 1930." Chicago. Reavis.
73. Cotton, G. Robert. "Collegiate Technical Education for Negroes in Missouri." Ohio. Anderson.
74. Couch, Paul Ellsworth. "The Character and Development of Education in the Civilian Conservation Corps Camps of the Seventh Corps Area." Indiana. Strayer.
75. Crawford, Bonner M. "Interests and Achievements of High-School Pupils." Michigan. Woody.
76. Crossen, Helen J. "The Effect of Selected Factors on Critical Interpretations in Reading." Chicago. Gray.
77. Crowley, William A. "The Relation of Indoctrination to American Democracy." Catholic University. Jordan.
78. Crudden, P. B. "The Development of a Program for Training Production Supervisors at the Philadelphia Navy Yard." Pennsylvania. Magill.
79. Culler, Ned. "Analysis of American Geography Textbooks, 1840–90." Pittsburgh. Nietz.
80. Cunningham, Isabelle H. "The Value of Museum Materials in the Elementary School as an Aid in Teaching Fourth-Grade Geography." New York. Keliher.
81. D'Amico, Mabel. "Ceramics in Education." Columbia. Ruffini.
82. Daniels, Dorothea A. "Organization and Administration of a Two and One-half Year Nursing Curriculum." New York. Nash.
83. Danin, Elizabeth L. "The Philosophy of John Dewey Interpreted and Implemented for the Elementary-School Principal in New York City." New York. Horne.
84. Davis, Blanche. "The Common Man on the New York Stage." Columbia. Smith.
85. Dealey, Sister M. Bonaventure. "Catholic Schools in Scotland." Catholic University. Cassidy.
86. Delaney, Eleanor. "Teacher Education in Mexico." Columbia. Stratemeyer.
87. Delman, Martin. "A Social Approach to Business Law." New York. Tonne.
88. Dewey, Charles S. "Concepts of Vocational Education in England from 1600 to 1760." Stanford. Almack and Kaulfers.
89. Dillon, Ina K. "The Formulation of a Plan for the Reciprocal Education of Parents and Teachers through the Elementary School." Columbia. Osborne.
90. Dillon, Roy A. "Historical and Technical Report of State Merit Systems of Personnel Administration." Oklahoma. Balyeat.
91. Ditzion, Sidney. "The Library and Society, 1850–1900." Columbia. Curti.
92. Dixon, Maloise S. "The Preparation in Physical Education of Prospective Classroom Teachers in the Pennsylvania State Teachers Colleges." Pennsylvania State. Jones.

93. Dougall, John B. "Trends in Certification of Teachers for Special Subjects, with Reference to New Jersey." New York. Powers.
94. Dowell, Pattie Simmons. "An Evaluation of Workshop Techniques at Winthrop College." New York. Speer.
95. Dreiser, M. Vera. "Health, Physical Education, and Recreation Programs in Municipally Owned Colleges and Universities." New York. Myers.
96. Drew, Gwendolyn. "Historical Study of the Concern of the Federal Government for the Physical Fitness of Youth." Pittsburgh. Gould.
97. Drew, Jesse M. "An Evaluation of the Student Personnel Practices of the Negro Land-Grant Colleges of the United States." Harvard. Brewer.
98. Drill, Edna. "Significance of Free Discussion Periods of Certain Elementary-School Children in New York State in Determining Science Interests Significant for Planning a Science Program." Cornell. Palmer.
99. Ducker, Henry. "The Reports of the Elementary Principal to the Local Superintendent of Schools." New York. Borgeson.
100. Dunham, Charles V. "A Study of the Inter-American Test of General Ability in Relation to the Stanford–Binet and Otis Quick-Scoring Tests." Texas. Manuel.
101. Dykhouse, Claude J. "The Determination of the Cost of a Position—Automatic—Merit Teachers' Salary Schedule in Detroit, 1920–43." Michigan. Moehlman.
102. Ellis, Rhoda. "The Value of a Food-Selection Program for the Changing of Food Habits." New York. Kremer.
103. Ellis, Vivian Esther. "A Plan for the Improvement of the Program for the Care and Education of Hard-of-Hearing Children in New York State." Columbia. Rowell.
104. Elsdon, C. L. "The Auditing of Internal School Accounts." Pittsburgh. Thurston.
105. Ely, Margaret H. "A Source Book of Gregg Shorthand for Teachers." New York. Reynolds.
106. Enochs, James B. "The Construction and Validation of a Test in English." Chicago. Tyler.
107. Everly, Hubert. "Adult Education in the Hawaii Islands." Ohio. Lewis.
108. Ewing, Ethel. "An Interpretation of the Far East for American Secondary-School Pupils." Cornell. Anderson.
109. Fehlman, Charlotte. "A Comparative Study of Parents' and Teachers' Appraisals of Children." Columbia. Jersild.
110. Ferguson, Ernest V., Jr. "Governmental Participation in Recreation in Response to the War Emergency." New York. Nash.
111. Fields, Victor. "Training in Singer's Voice: Fundamental Principles of Voice Culture for Guidance of Teachers of Singing." Columbia. Mursell.
112. Fisher, Kenneth A. "The Rorschach Technique for Air Craft Pilot Selection." Columbia.

113. Fletcher, Raymond. "Legal Controls and Supplementary Provisions Affecting Elementary Schools in the Forty-Eight States" Texas. Otto.

114. Florell, David M. "The Origin and History of the Professional School of Education at the University of California at Los Angeles." California (Los Angeles). Morrisett.

115. Floyd, Hazel. "The Elementary-School Library in Texas." Texas. Otto.

116. Flubacher, Joseph. "The Concept of Ethics in the Development of Economic Thought." Temple. Mack.

117. Fordyce, W. G. "Evaluation of Teacher Unions." Ohio. Lewis.

118. Foster, A. N. "The Test-Study Method Versus the Study-Test Method of Teaching Spelling." Colorado State College of Education. McKee.

119. Foudy, John T. "The Educational Philosophy of American Humanism." Catholic University. O'Leary.

120. Fox, Mother Helen Ethelyn. "Reading Deficiencies in College." Marquette. Vander Beke.

121. Friedsam-Korner, A. "Hostility as Expressed in Play and Real-Life Situations in a Group of 'Normal' Preschool Children." Columbia. Strang.

122. Frier, Ernest A. "Differences between High-Expenditure and Low-Expenditure Central Rural and Union Free School Districts." New York. Myers.

123. Gall, Morris. "Judicial Decision and Method of Practical Judgment." Columbia. Raup.

124. Gallagher, Sister Marie Patrice. "The History of Catholic Elementary Education in the Diocese of Buffalo." Catholic University. Cassidy.

125. Galvarro, Pauline. "A Study of the Marital Status of Women in the Teaching Profession, with Special Concern for the Unmarried Teacher." Northwestern. Rosecrance.

126. Gardiner, Margaret M. "Comparison and Evaluation of Nursery-School Teaching." Columbia. Jersild.

127. Gastwirth, Paul. "The Relationship of Theory and Practice in the Internal Organization of the Curriculum in Selected Elementary Schools." Columbia. Caswell.

128. Gates, John W. "The Civic Competence of High-School Seniors." Chicago. Reavis.

129. Gee, J. E. "Nature and Functions of the Office of Public-School Clerk of Boards of Education in Ohio." Pittsburgh. Yeager.

130. Gell, Kenneth E. "What American High-School Graduates Should Know about Canada." Harvard. Wilson.

131. Giauque, Charles D. "A Factor Study of the Relationships among Health, Strength, and Certain Traits of Character." New York. Nash.

132. Gibson, E. Dana. "Communication Sound Slide Scripts." New York. Lomax.

133. Girgen, Sister Mary Incarnata. "The Contributions to Education by the Benedictine Monasteries of the American-Cassinese Congregation." Saint Louis. McGucken.

134. Goldberg, Samuel B. "A Health Examination and Follow-up Procedure for New York City Public High Schools." New York. Nash.

135. Good, Leonard F. "A Unified Financial Accounting System for Nebraska Schools Adapted to Variations in Their Size." Nebraska. Broady.

136. Goodson, Max R. "An Evaluation of Some Theories for Integrating the School Program." Illinois. Smith.

137. Gordon, Gary. "School Transportation in Colorado." Colorado. Grieder.

138. Green, H. H. "A Study of the Transcribing Process." Pittsburgh. Lessenberry.

139. Green, Harriet C. "An Objective Analysis of Eye Movements in 50 Matched Male Pre-Pubescent Stuttering and Non-Stuttering School Children." Columbia. Kopp.

140. Greenfield, Edward A. "Wartime Problems of the Small Merchant in the Weir-Cove Area, West Virginia." New York. Tonne.

141. Griffin, Elinor Fitch. "Relation of Adjustment to Growth in Mentally Deficient Boys." Michigan. Olson.

142. Groh, Rosa E. "A Survey of Practices in the Development of Personality." Pittsburgh. Yoakam.

143. Grueninger, Robert M. "Body Build and Motor Performance." Michigan. Hughes.

144. Gustafson, Elton T. "An Experimental Study of the Relationship between the Latent Time of the Pupillary Light Reflex and Various Mental Measurements." New York. West.

145. Haar, Franklin B. "Interests of High-School Pupils in Personal Hygiene." Pittsburgh, Hutson.

146. Hagenhoff, Sister M. Pelagia. "The Educational Philosophy of Friedrich Wilhelm Foerster." Catholic University. Jordan.

147. Hagman, Patricia. "The New York State War Council Program of Physical Fitness for Girls and Women." Columbia. Hughes.

148. Halderman, Leonard. "The Effect of Tax Exemption of Real Estate on the Ability of School Districts to Support Education." Temple. Owen.

149. Hamilton, Eleanor. "Emotional Reactions of Women to Pregnancy and Childbirth." Columbia. Osborne and Wilson.

150. Haney, Earl McKinley. "An Appraisal of the Values of Adult Education in Milwaukee County." Marquette. Vander Beke.

151. Hansen, Carl Francis. "The Development and Testing of a Technique for Improving Sentence Sense by Thought Analysis." Southern California. Weersing.

152. Harmon, Allen C. "The Supervision of Instruction in Selected Secondary Schools." Pennsylvania. Reller.

153. Harnett, Arthur L. "A Plan for the Further Development of the Columbia College Physical-Training Program for Navy V-12." Columbia. Hughes.

154. Harris, Ernest E. "Writing and Scoring for the Modern Band." Columbia. Church.

155. Hartley, Ruth. "Structure and Functioning of Social Expansiveness in Boys of Elementary-School Age." Columbia. Watson.

156. Hausrath, Alfred H., Jr. "The Effect of a Single Reading at the College Level." Iowa. Horn.

157. Hayden, Lyle J. "The Professional and Technical Preparation of Teachers of Agriculture, as Derived from 360 Cases in 1941." Cornell. Stewart.

158. Hayman, Howard S. "A Health Program for Oregon." Columbia. Brownell.

159. Hazelton, Edward W. "The Development of the Mathematics Curriculum in Chicago Public High Schools." Chicago. Reavis.

160. Heffernon, Sister Mary Austin. "A Pedagogical Approach to the Solution of Some Personal Adjustment Problems through Group Guidance in the High School." Washington (Seattle). Corbally.

161. Henderson, Grace. "Criteria for Evaluating Administrative Procedures in Developing College Programs of Home and Family Life." Ohio. Hullfish.

162. Hendrickson, Thomas S. "Supervision in Catholic Rural Schools." Marquette. Treacy.

163. Henry, Sybil. "The Effect of Deficient Auditory Acuity on Learning to Read." North Carolina. Jordan.

164. Herlinger, Harry V. "The School Treasurer, with Special Reference to the Functions of the Office." Pittsburgh. Yeager.

165. Herr, Selma E. "The Effect of Pre-First Grade Training upon Reading Readiness among Spanish-American Children." Texas. Otto.

166. Hesser, James M. "A Course of Study in Music Education for Prospective Elementary Teachers in the Teacher-Training Institutions of West Virginia." New York. Myers.

167. Hickey, John M. "The Personnel Factor in Relation to the Program of Public-School Relations." Pittsburgh. Yeager.

168. Hightower, Estelle. "The Selection of Curriculum Source Materials Appropriate for Social Science in the Secondary Schools of Alabama." Columbia. Caswell.

169. Hilbert, Margaret C. "A Guide for High-School Students of Home Nursing." New York. Manzer.

170. Hilliard, David M. "A Case Study of Public-School Administration in the City of Memphis, Tennessee." Chicago. Reavis.

171. Hinchey, Clarence E. "An Evaluation of the Moehlman Law of Teachers' Salaries and Salary Index." Michigan. Moehlman.

172. Hobart, Helen W. "Racial Segregation in Virginia Public Schools." Michigan. Eggertsen.

173. Hoffland, Laura. "Regionalism as an Approach to Educational Planning." Washington (Seattle). Corbally and Draper.

174. Holloway, T. Fred. "An Electrocardiographic Study of College Athletes." New York. Nash.

175. Holmes, Frank L. "General Property Tax Delinquency and Its Collection, with Special Reference to Public-School Support and Proposals for Improvement in Collection." Nebraska. Henzlik.

176. Holter, Frederick. "A Critical Analysis of Expressed Desires of College Students for Recreational Activity as a Basis for Program Selection." New York. Nash.

177. Horrocks, John E. "An Evaluative Follow-up Study of the Graduates of the Functional Program of Teacher Education at Syracuse University." Syracuse. Troyer.

178. Huddleston, Louis D. "A Study to Determine the Subject Content for a Year of Consumer Education in the Secondary-School Curriculum." New York. Lomax.

179. Hulbert, Marshall. "An Institutional Case Study of the Educational Program of a Liberal Arts College, with the Purpose of Projecting a Program for Future Development." Northwestern. Rosecrance.

180. Hung, Ching Chong. "A Study of the Social and Educational Problems of the Second-Generation Chinese in the District of Columbia." George Washington. Jarmen.

181. Hunt, Grace C. "Planning and Initiating a Two-Year Program in Arkansas Polytechnic College for Students Who Expect to Teach in the Rural Elementary Schools of the Mountainous Sections of North Arkansas." Columbia. Dunn and Evenden.

182. Hutchison, Keith R. "The Mind of Peter Parley." Columbia. Reisner.

183. Huus, Helen. "Factors Associated with the Reading Problems of Children from a Migratory Population." Chicago. Gray.

184. Irwin, Herbert S. "An Evaluation of Certain Cooperative Work-Experience Programs in Southern California." Southern California. Lefever.

185. Jackson, James D. "Certain Psychological Factors in Recidivism." New York. Tomlinson.

186. Jackson, Joseph. "Relative Effectiveness of Pencil-Paper Tests, Interview, and Rating as Techniques of Evaluating Personality." Michigan. Woody.

187. Jacobs, Guy A. "The Supply of, and the Demand for, Teachers of One- and Two-Teacher Rural Schools of South Dakota." New York. Myers.

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189. Jahrling, Robert. "A Comparative Study of the Theoretical and Experimental Contributions of E. R. Jaensch and R. H. Wheeler to Educational Psychology." New York. Tomlinson.

190. Jewett, Robert. "The Attitudes of Freshmen in Matters Relating to the Second World War." Ohio. Landsittel.

191. Jollief, John H. "Evaluation as an Aspect of State Supervision of Elementary Schools." Indiana. Strayer.

192. Jones, Lloyd L. "A Text in Consumer Economics." New York. Tonne.

193. Jones, Marc Edmund. "A Historical Study of the Interrelations between the Instrumentalist Philosophy and Progressive Education, as Shown in Their Formative Period." Columbia. Childs.

194. Joy, Bernard M. "Induction Training of County Extension Agents." George Washington. Fox.

195. Junge, Charlotte. "Development of a Foundation Program of Study in Mathematics from the Mathematical Viewpoint." Iowa. Spitzer.

196. Kaback, Goldie R. "The Degree to Which the Rorschach Group Method Differentiates between Accountants and Pharmacists." Columbia. Kitson.

197. Kaplan, Milton. "Radio and Poetry." Columbia. Grey.

198. Karls, Glen. "An Elementary Course of Study in Agriculture for the Schools of Southwest Missouri." Missouri. Dickinson.

199. Kavanagh, Sister M. Alexandra. "A Comparative Study of Potential Leaders and Non-Leaders among Girls in the Early Years of Adolescence." Fordham. Kelly.

200. Keiper, Rena V. "Protestant Deaconess Work in America Today." Columbia. Johnson.

201. Keislar, Evan. "The Relationship of Information to Beliefs and Attitudes of High-School Students." California (Berkeley). Keys.

202. Kelley, Frances. "A Study of the Inter-American Tests in Relation to Achievement at the High-School Level." Texas. Manuel.

203. Kelly, Marcella R. "A Comparative Study of the Health and Behavior of Children of Working and Non-Working Mothers." Yale. Gambrill.

204. Kennelly, Edward F. "A Historical Study of Seton Hall College." New York. Long.

205. Kilburn, Hyrum P. "Procedures in Developing Terminal Courses of Study in Junior Colleges." Stanford. Almack.

206. Kilby, Richard W. "Remedial Reading for College Freshmen." Yale. Tilton and Hill.

207. Kilcoyne, Francis P. "Social Thought and Criticism by John Galsworthy." New York. Barnes.

208. Kingsbury, Charles Lawrence. "Harmonic Skills Used by Selected High-School Instrumental Leaders." Indiana. Somers.

209. Kline, Harriet H. "A Course of Study in English for Potential Homemakers and Millworkers." New York. Barnes.

210. Kolodny, Julius. "Interpretation of Institutionalism: A Study of the Social, Political, Economic, and Educational Views of Thorstein Veblen." New York. Long.

211. Koos, Earl L. "Crisis and the Low-Income Urban Family." Columbia. Brunner and Hallenback.

212. Koukal, Walter V. "The Role of Placement Service in the General Secondary Schools of New York State." Syracuse. Smith.

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215. Kutash, Samuel B. "A Comparative Study of Institutionally Adjusted and Maladjusted Defective Delinquents." New York. Tomlinson.

216. LaFollette, Ernest R. "Discovery and Utilization of Leisure-Time Interests of Students Entering the Secondary School." Ohio. Heck.

217. Lamoreaux, R. Ross. "An Analysis of American Methods for the Treatment of Stuttering." Harvard. Mowrer.

218. Lange, Paulus J. H. "Three Programs of General Education." Chicago. Tyler.

219. Larson, Mildred R. "Robert Frost as a Teacher." New York. Barnes.

220. Lauer, Faber. "A Century of the Teaching of the History of Education in America." Johns Hopkins. Thursfield.

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223. Lee, Maurice A. "Nature and Causes of the Difficulties of High-School Students in Reading Different Types of Materials—Historical, Scientific, Mathematical, and Imaginative." Chicago. Gray.

224. Leese, Joseph. "Wartime Requests of Selected Government Agencies and the Curriculum." Columbia. Hopkins.

225. Leslie, Glen F. "The Development of Financial Support for Education in Missouri." Missouri. Carpenter.

226. Lester, Seelig L. "A Manual for Use in Supervision of Vocational-Industrial Education." New York. Sears.

227. Levy, William. "An Enriched Work-Experience Program and Its Application to General Education." Ohio. Eikenberry.

228. Libby, Herschel Scott. "A Building Program for the Public Schools of Irvington, New Jersey." New York. Radosavljevich.

229. Liebman, Rebekah. "An Experimental Study of the Results of Two Methods of Teaching English and the Social Studies in the Secondary Schools." Johns Hopkins. Bamberger.

230. Lillywhite, Herold. "Speech Needs of Elementary and Secondary Teachers in Minnesota." New York. Mulgrave.

231. Lindel, Albert L. "Missouri School Law, as Developed in the State Courts of Last Resort." Missouri. Carpenter.

232. Littlejohn, Vance T. "Ocular Fatigue in Typewriting." Pittsburgh. Lessenberry.

233. Loeb, Julius. "An Exposition of the Systematic Presentation of Wilhelm J. Ruttman's Pedaegogisch Arbeitalshre." New York. Radosavljevich.

234. Lombard, Lee. "Social Attitudes of Contemporary Harlem Writers." New York. Barnes.

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236. Long, Luther Craig. "A Study of Personality and Attitude Measurements of Students Who Belong to the Inter-Collegiate Gospel Fellowship." New York. Hoppock.

237. Losi, Carrie R. "A Follow-up Study of Graduates and Drop-Outs from South Side High School in Newark, New Jersey." New York. Radosavljevich.

238. Lumsden, Mrs. D. V. "A Study of Basic Language Skills." George Washington. Fox.

239. Lyles, Victoria. "A Plan for the Improvement of the Teaching and Learning of Reading in the York, Pennsylvania, Public Schools." Columbia. Hopkins.

240. Lyons, Catharine A. V. "Pupil Evaluation of School Clubs." Pittsburgh. Hutson.

241. MacCarthy, Eileen M. "Some Cultural Limitations to Literary Expression, as Shown in Trends and Influences in the Anglo-Irish Novel and in the Abbey Theatre." New York. Barnes.

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405. Vanderslip, Robert G. "Evaluation of Student Self-Government in Selected High Schools." George Washington. Fox.

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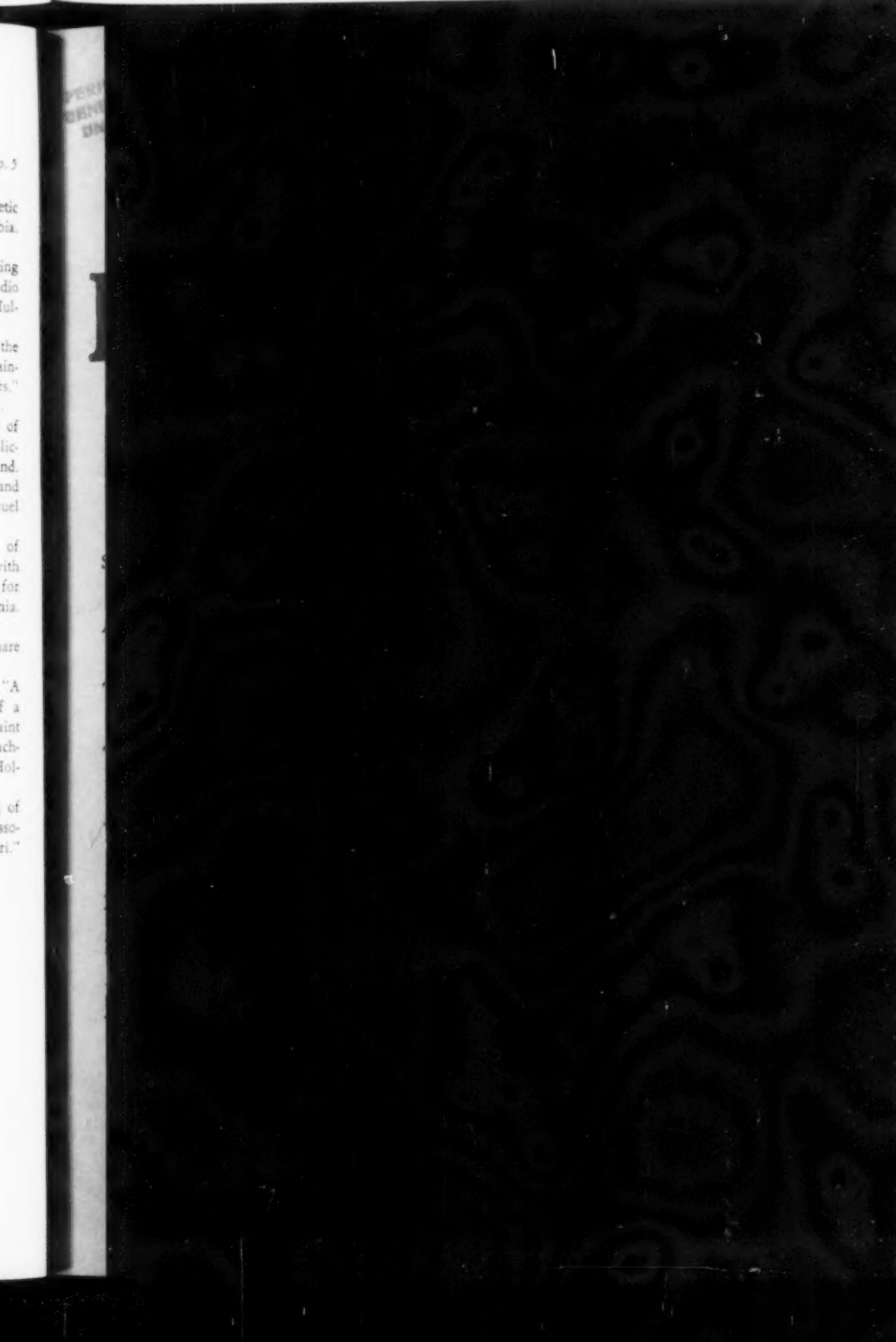
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